Submission to the Royal Commission on Forestry

Nova Scotia

Department of Lands and Forests

Halifax · 1983

A SUBMISSION TO THE NOVA SCOTIA
ROYAL COMMISSION ON FORESTRY

The Nova Scotia Department of
Lands and Forests
Halifax, N.S.
April 1983

Hon. D.L. Geo. Henley
Minister

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This document was prepared under the direction of Mr. J.D. Smith, Senior Director of Program Planning, who also made a substantial contribution to the text. Mr. G.L. Saunders, Manager, Forest Resources Education, undertook the task of editing the complete document as well as the preparation of portions of the text. Mr. R.E. Bailey, Director of Reforestation and Silviculture developed the forest managment scenarios and wrote related sections. Mr. F.R. Wellings, Director, Forest Resource Management and Mensuration, was responsible for the section on inventory. Mr. M.H. Prime, Director of Wildlife, provided the wildlife input and Mr. B.N. Diamond, Director, Parks and Recreation was responsible for the parks and outdoor recreation section.

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D.L. Eldridge
Deputy Minister

April, 1983

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Introduction

INTRODUCTION

This report has been prepared for the Royal Commission on Forestry in Nova Scotia and is intended primarily to assist the Commissioners in discharging their responsibilites. It is not a history of forestry and related activities in Nova Scotia. Nor is it a compendium of facts, although it contains considerable factual information. Rather, it represents an attempt to present information germane to the issues and problems attendant to forestry, wildlife and recreation. Brief historical perspectives have been included only where considered useful.

The report has been organized in three parts. The first part, dedicated to forestry matters, commences with a brief historical account followed by a summary of the most recent data on our forest resources derived from the ongoing forest inventory. The ownership of forest land and the constraints on the use of these lands are then discussed, followed by a short description of our forest industry. Harvesting and related matters are examined in Chapter 5, leading to an analysis of insect problems and forest management requirements in succeeding sections. Forest protection, while logically part and parcel of forest management, is nonetheless accorded separate treatment in Chapter 8. Education and training issues are the penultimate consideration, followed by a chapter on statutory considerations and financial arrangements. A summary is provided in the final section.

Part 2 contains a discussion of wildlife management issues. This commences with a brief introduction, followed by a short historical summary of wildlife conservation efforts. Public attitudes toward wildlife, the value of wildlife, jurisdictional considerations and forest-wildlife management concerns are treated in ensuing sections. This part also concludes with a brief summary.

The third part is devoted to Provincial Parks and outdoor recreation issues relevant to forest management. It consists of five chapters organized as follows: Provincial Parks and outdoor recreational opportunities in the forest environment, the adequacy of the supply of outdoor recreational opportunities, the forest as a heritage resource and the management of outdoor recreational opportunities in the forest environment. The fifth chapter is entitled: Conclusion: the Provincial Approach, followed by a summary.

While various references to the Department of Lands and Forests have been made in the document, no detailed discussion of the Department has been attempted. Accordingly, a brief description of its organizational structure and supporting legislation is provided in the following pages.

THE DEPARTMENT OF LANDS AND FORESTS

The Department of Lands and Forests was established by Legislation enacted in 1926. It is charged with administering the Lands and Forests Act and various other statutes, including the Beaches Preservation and Protection Act, the Land Titles Clarification Act and the Provincial Parks Act. From these it derives authority to manage Crown lands, to provide a system of parks, and to protect the forests, wildlife and beaches. Inherent in the Legislation and incumbent upon the department are responsibilities pertaining to the productivity of the forests generally, the implementation of forest management programs, the supply of forest products, public education, and the enhancement of recreational and scenic values. The department also assists federal agencies in enforcing the Migratory Birds Convention Act.

The functions and activities of the department are carried out through four branches: Administration, Operations, Program Planning and Land Services. This structure is shown in Figure 1.

Unless otherwise indicated, functions are located in Halifax (P.O. Box 698, Halifax, Nova Scotia B3J 2T9).

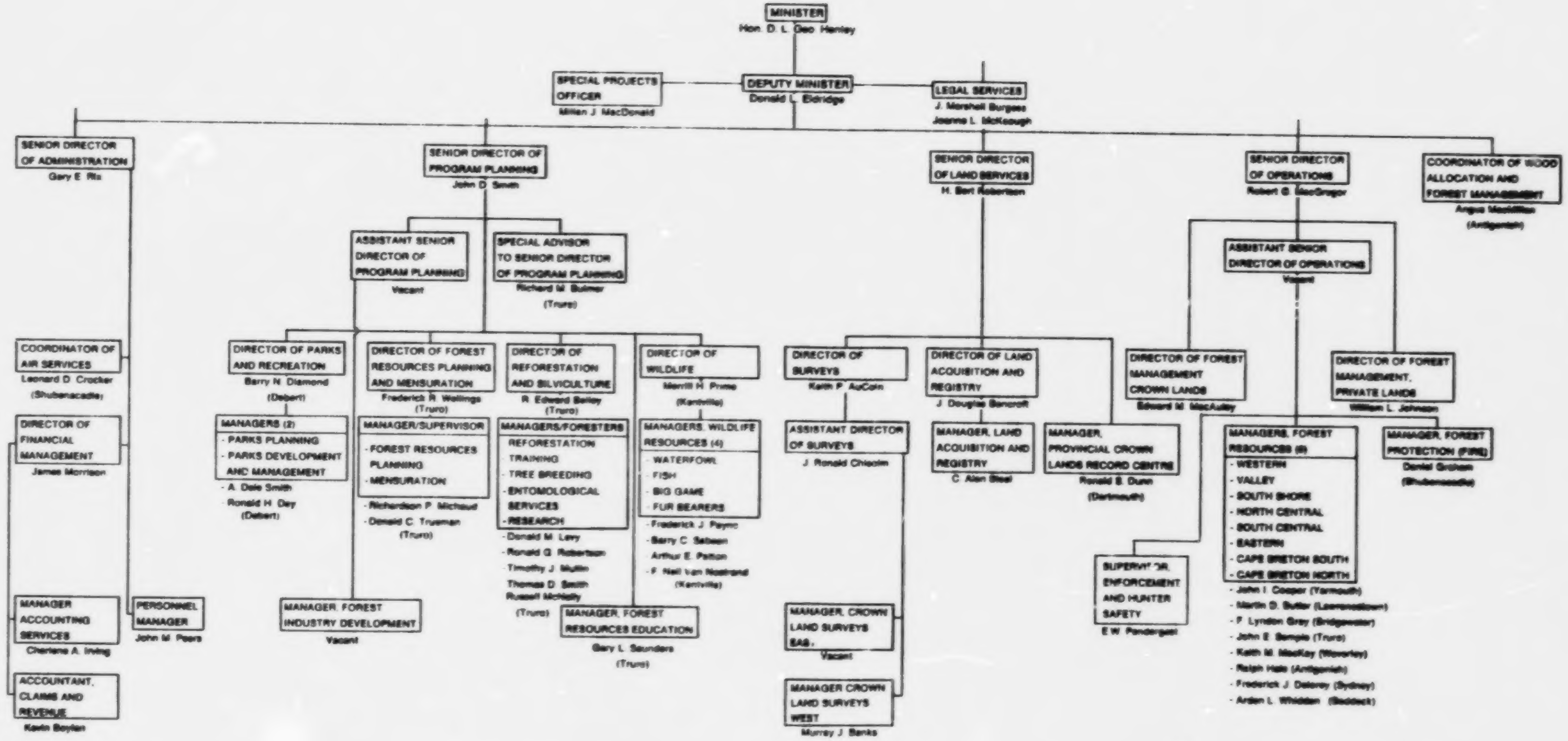
The department is well decentralized with staff and facilities located in all municipalities (Figure 2).

Figure 1

MANAGEMENT ORGANIZATION

DEPARTMENT OF LANDS AND FORESTS

PROVINCE OF NOVA SCOTIA


MINISTER
Hon. D. L. Geo. Henley
DEPUTY MINISTER
Donald L. Eldridge
SPECIAL PROJECTS OFFICER
Millen J. MacDonald
LEGAL SERVICES
J. Marshall Burgess
Joanne L. McKeough
SENIOR DIRECTOR OF ADMINISTRATION
Gary E. Ritz
COORDINATOR OF AIR SERVICES
Leonard D. Crocker
(Shubenacadie)
DIRECTOR OF FINANCIAL MANAGEMENT
James Morrison
MANAGER ACCOUNTING SERVICES
Charlene A. Irving
ACCOUNTANT, CLAIMS AND REVENUE
Kevin Boylan
PERSONNEL MANAGER
John M. Peers
SENIOR DIRECTOR OF PROGRAM PLANNING
John D. Smith
ASSISTANT SENIOR DIRECTOR OF PROGRAM PLANNING
Vacant
SPECIAL ADVISOR TO SENIOR DIRECTOR OF PROGRAM PLANNING
Richard M. Bulmer
(Truro)
DIRECTOR OF PARKS AND RECREATION
Barry N. Diamond
(Debert)
MANAGERS (2)
- PARKS PLANNING
- PARKS DEVELOPMENT AND MANAGEMENT
- A. Dale Smith
- Ronald H. Dey
(Debert)
DIRECTOR OF FOREST RESOURCES PLANNING AND MENSURATION
Frederick R. Wellings
(Truro)
MANAGER/SUPERVISOR
- FOREST RESOURCES PLANNING
- MENSURATION
- Richardson P. Michaud
- Donald C. Trueman
(Truro)
DIRECTOR OF REFORESTATION AND SILVICULTURE
R. Edward Bailey
(Truro)
MANAGERS/FORESTERS
- REFORESTATION
- TRAINING
- TREE BREEDING
- ENTOMOLOGICAL SERVICES
- RESEARCH
- Donald M. Levy
- Ronald G. Robertson
- Timothy J. Mullin
Thomas D. Smith
Russell McNally
(Truro)
DIRECTOR OF WILDLIFE
Merrill H. Prime
(Kentville)
MANAGERS, WILDLIFE RESOURCES (4)
- WATERFOWL
- FISH
- BIG GAME
- FUR BEARERS
- Frederick J. Payne
- Barry C. Sabean
- Arthur E. Patton
- F. Neil van Nostrand
(Kentville)
MANAGER, FOREST INDUSTRY DEVELOPMENT
Vacant
MANAGER, FOREST RESOURCES EDUCATION
Gary L. Saunders
(Truro)
SENIOR DIRECTOR OF LAND SERVICES
H. Bert Robertson
DIRECTOR OF SURVEYS
Keith P. AuCoin
ASSISTANT DIRECTOR OF SURVEYS
J. Ronald Chisholm
MANAGER, CROWN LAND SURVEYS EAS.
Vacant
MANAGER CROWN LAND SURVEYS WEST
Murray J. Banks
DIRECTOR OF LAND ACQUISITION AND REGISTRY
J. Douglas Bancroft
MANAGER, LAND ACQUISITION AND REGISTRY
C. Alan Steel
MANAGER, PROVINCIAL CROWN LANDS RECORD CENTRE
Ronald S. Dunn
(Dartmouth)
SENIOR DIRECTOR OF OPERATIONS
Robert G. MacGregor
ASSISTANT SENIOR DIRECTOR OF OPERATIONS
Vacant
DIRECTOR OF FOREST MANAGEMENT CROWN LANDS
Edward M. MacAulay
DIRECTOR OF FOREST MANAGEMENT, PRIVATE LANDS
William L. Johnson
SUPERVISOR, ENFORCEMENT AND HUNTER SAFETY
E.W. Pendergast
MANAGERS, FOREST RESOURCES (8)
- WESTERN
- VALLEY
- SOUTH SHORE
- NORTH CENTRAL
- SOUTH CENTRAL
- EASTERN
- CAPE BRETON SOUTH
- CAPE BRETON NORTH
- John I. Cooper (Yarmouth)
- Martin D. Butler (Lawrencetown)
- F. Lyndon Grey (Bridgewater)
- John E. Semple (Truro)
- Keith M. MacKay (Waverley)
- Ralph Hale (Antigonish)
- Frederick J. Delorey (Sydney)
- Arden L. Whidden (Baddeck)
MANAGER, FOREST PROTECTION (FIRE)
Daniel Graham
(Shubenacadie)
COORDINATOR OF WOOD ALLOCATION AND FOREST MANAGEMENT
Angus MacMillan
(Antigonish)

Note: All positions located in Halifax unless otherwise shown

JUNE, 1982

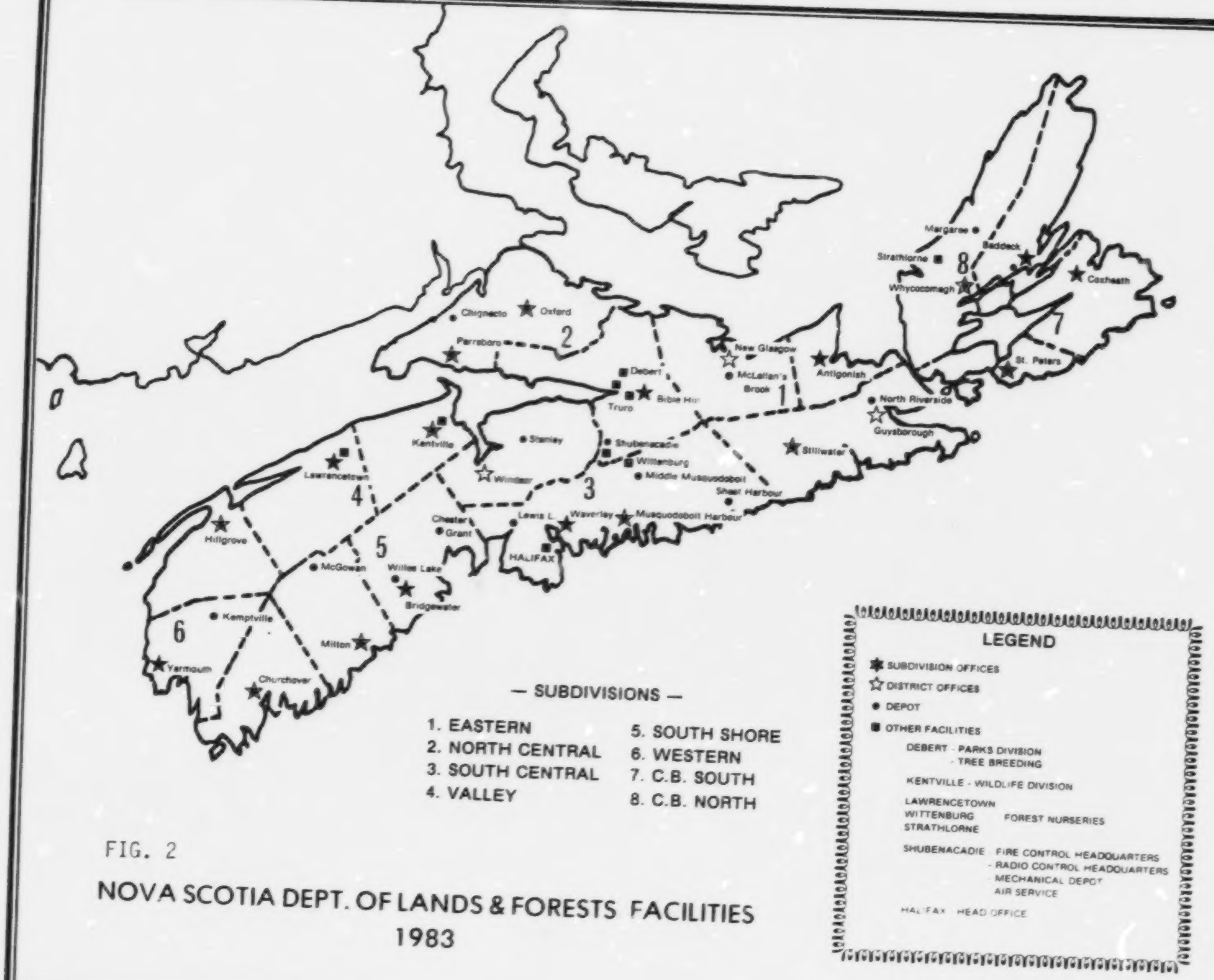

Margaree
Baddeck
Strathlorne
8
Whycocomagh
Coxheath
7
St. Peters
Chignecto
Oxford
2
Parrsboro
New Glasgow
McLellan's Brook
1
Antigonish
North Riverside
Guysborough
Debert
Truro
Bible Hill
Stillwater
Kentville
Stanley
Shubenacadie
Wittenburg
Middle Musquodoboit
Lawrencetown
Windsor
3
Sheet Harbour
4
Chester
Grant
Lewis L.
Waverley
Musquodoboit Harbour
Hillgrove
5
HALIFAX
McGowan
Willes Lake
Bridgewater
6
Kemptville
Milton
Yarmouth
Churchover
— SUBDIVISIONS —
1. EASTERN
2. NORTH CENTRAL
3. SOUTH CENTRAL
4. VALLEY
5. SOUTH SHORE
6. WESTERN
7. C.B. SOUTH
8. C.B. NORTH
LEGEND
SUBDIVISION OFFICES
DISTRICT OFFICES
DEPOT
OTHER FACILITIES
DEBERT - PARKS DIVISION
- TREE BREEDING
KENTVILLE - WILDLIFE DIVISION
LAWRENCETOWN
WITTENBURG
STRATHLORNE
FOREST NURSERIES
SHUBENACADIE - FIRE CONTROL HEADQUARTERS
- RADIO CONTROL HEADQUARTERS
- MECHANICAL DEPOT
AIR SERVICE
HALIFAX - HEAD OFFICE

FIG. 2

NOVA SCOTIA DEPT. OF LANDS & FORESTS FACILITIES
1983

Administration Branch

The Administration Branch is responsible for a variety of financial, personnel, and administrative services, as well as the provision of air services. It is also responsible for implementing administrative policies, procedures, and directives on behalf of the Deputy Minister and Minister. The branch is composed of three divisions: Financial Management, Personnel Administration, and Air Services.

- Financial Management includes budget preparation and control, financial reporting, payment of accounts, the administration and collection of revenue, financial aspects of cost-shared programs, and administration.

- Personnel Administration covers employee remuneration and benefits, maintenance of employee records, recruitment and selection, organization and establishment, staff training and development, administration of casual wages rates and policy.

- Air Services (P.O. Box 130, Shubenacadie, N.S. B0N 2H0. Provides centralized aircraft requirements to all government departments and agencies. Primary functions include forest fire control, air support in emergency situations, resource development, and transportation.

Program Planning Branch

The Program Planning Branch is responsible for developing, evaluating, and recommending policy and program alternatives in forest management, park development, wildlife management and forest industry development. The branch is also responsible for the implementation of support programs, including forest nurseries, forest research, silviculture training, education and public information, wildlife parks, aerial insect protection programs and entomological services. The branch is comprised of four divisions and two subdivisions. The divisions are: Reforestation and Silviculture; Forest Resources Planning and Mensuration; Wildlife; and Parks and Recreation - located in Truro, Kentville and Debert respectively. The Forest Resources Education subdivision is located in Truro and the Forest Industry Development subdivision is in Halifax. Direction in each case is provided from Halifax head office.

- The Reforestation and Silviculture Division (P.O. Box 68, Truro, N. S. B2N 5B8) is responsible for planning and directing department programs which effectively increase and improve forest yields within the province. This includes tree breeding, forest nurseries, silviculture training, forest research, entomology, and aerial insect protection programs.

- Tree Breeding Centre

  DEBERT, Nova Scotia
  BOM 1CO

- Forest Nurseries

- Provincial Forest Nursery
  P.O. Box 130
  LAWRENCETOWN, Nova Scotia
  BOS IMO

- Strathlorne Forest Nursery
  INVERNESS, Nova Scotia
  BOE 1NO

- Wittenburg Forest Nursery
  P. O. Box 250
  STEWIACKE, Nova Scotia
  BON 2J0

- The Forests Resources Planning and Mensuration Division (P.O. Box 68, Truro. N. S. B2N 5B8), is charged with maintaining a continuing forest inventory of all lands, land evaluation, scaling functions and with carrying out forest resources planning, which includes Crown land management planning, economic planning and road engineering.

- The Wildlife Division (P. O. Box 515, Kentville, N. S. B4N 3X3) is charged with appraising and evaluating the status and population trends of wildlife and inland fish species and with recommending harvest programs. The division also operates wildlife parks in Shubenacadie (Colchester County), Upper Clements (Annapolis County), and Two Rivers (Cape Breton County), and a fish rearing station at Kelly Lake (Halifax County).

- The Parks and Recreation Division (R.R. #1, Belmont, Debert, N.S. BOM 1C0) is responsible for conducting and preparing plans for the orderly development of a parks and trails system as well as the construction program.

- The Forest Resources Education Subdivision (P.O. Box 68 Truro, N.S. B2N 5B8) is responsible for a comprehensive education and technical information program for the general public and the department staff.
- The Forest Industry Development Subdivision identifies, investigates and analyses development opportunities for wood-using industries within the province; advises on related support programs; and provides a technical advisory service to the sawn products sector.

Operations Branch

The Operations Branch is responsible for implementing and maintaining the department's programs in forest fire control, protection of beaches, fish and wildlife, enforcement of fish and game regulations; management of the Crown lands, including timber sales and forest improvement; administration of programs of assistance to private woodland owners; a management advisory service; construction and operation of provincial parks and other outdoor recreation areas, administration of designated game sanctuaries; provision of field assistance in planning, data collection and other services in Crown land administration and resource education; and gathering of statistics on forest resource use.

The branch functions through its senior staff located in Halifax and Shubenacadie and through eight geographical subdivisions.

- The Provincial Forest Fire Control Centre (P.O. Box 130, Shubenacadie, N.S. BON 2HO) is responsible for acquiring, distributing and maintaining fire control equipment, the motor vehicle fleet and heavy equipment. The centre also is responsible for operating and maintaining the Integrated Mobile Radio System which services user departments and agencies of government, hospitals and ambulances, fire departments and the RCMP.

The province is divided into eight roughly equal geographical subdivisions, (Figure 2) each staffed with a resource manager, a Crown lands forester, a private lands forester, and, in most cases, a biologist. Within the subdivisions are districts headed by supervisors and staffed by forest technicans, field clerks, maintenance personnel and forestry crews. This staff implements department programs in the field.

Operations Field Offices

Western
(Yarmouth, Digby, Shelburne Counties)

10 Starr's Road
YARMOUTH, N. S.
B5A 2T1

P.O. Box 369
SHELBURNE, N.S.
BOW 1WO

P. O. Box 367
DIGBY, N.S.
B0V 1A0

Kemptville Depot
KEMPTVILLE, N. S.
BOT 1WO

South Shore
(Queens, Lunenburg Counties)

99 High Street
Provincial Building
BRIDGEWATER, N. S.
B4V 1V8

McGowan Lake Depot
CALEDONIA, N.S.

P. 0.Box 190
MILTON, N. S.
BOT 1PO

Wiles Lake Depot
BRIDGEWATER, N. S.

Chester Grant Depot
CHESTER, N. S.

Valley
(Annapolis, King Counties)

120 Exhibition Street
Provincial Building
KENTVILLE, N. S.
B4N 4E5

P.O. Box 130
LAWRENCETOWN,
N.S. BOS 1MO

South Central
(Halifax, Hants Counties)

Box 23, Site 2
R.R. #1, WAVERLEY, N.S.
B0N 2S0

MUSQUODOBOIT
HARBOUR, N.S.
B0J 2L0

MIDDLE MUSQUODOBOIT
Nova Scotia
B0N 1X0

P. O. Box 130
SHUBENACADIE, N. S.
B0N 2H0

Stanley Hangar
R. R. #1, SCOTCH VILLAGE
B0N 2G0

P. O. Box 130
WINDSOR, N. S.
B0N 2T0

LEWIS LAKE DEPOT
R. R. #3, ARMDALE, N. S.
B3L 4J3

North Central
(Cumberland, Colchester Counties)

P.O. Box 130
OXFORD, N. S.
B0M 1P0

P.O. Box 428
PARRSBORO,
N.S. B0M 1S0

626 College Road
BIBLE HILL, N. S.
B2N 2R2

Eastern
(Pictou, Guysborough, Antigonish
Counties)

11 James Street
Provincial Building
ANTIGONISH, N. S.
B2G 1R6

P.O. Box 50
GUYSBOROUGH,
BOH 1NO

R.R.#2, ASPEN
Guysborough Co.,
N.S. B0H 1E0

603 Maritime Bldg.
NEW GLASGOW, N.S.
B2H 2P9

ANTIGONISH DEPOT
Antigonish, N.S.

MACLELLAN'S BROOK
DEPOT
New Glasgow, N.S.

NORTH RIVERSIDE DEPOT
Guysborough, N. S.

Cape Breton North
(Inverness, Victoria Counties)

P.O. Box 68
BADDECK, N. S.
BOE 2HO

P.O. Box 130
WHYCOCOMAGH, N.S.
BOE 3MO

Cape Breton South
(Richmond, Cape Breton Counties)

COXHEATH DEPOT
R.R.#6, Sydney
N.S. B1P 6T2

Provincial Building
ST. PETER'S, N. S.
BOE 3B0

Land Services Branch

The Land Services Branch is comprised of the following: the Land Acquisition and Registry Division, the Surveys Division, and the Provincial Crown Lands Record Centre.

- The Acquisition and Registry Division is responsible for the acquisition and disposal of

Crown Lands administered by the Department of Lands and Forests and acts on behalf of other departments and agencies in the acquisition and disposal of land. The division prepares all legal documentation related to deeds, leases, grants, licenses, certificates and letters of authority. Necessary legal and other documentation for the Beaches Preservation and Protection Act, Land Titles Clarification Act, Land Holdings Disclosure Act, and Parks Development Act are prepared by the division. A large number of expropriations is carried out in cooperation with the Expropriating Authority.

All Quieting of Titles actions are referred to the division prior to court proceedings to determine if the Department of Lands and Forests has an interest in the action.

The Registry Section of the division acts as custodian for all Crown land records dating back to 1730. Thousands of inquiries from the public related to land title problems are handled annually.

The division is responsible for the investigation and settlement of claims to ungranted land.

- The primary objective of the Surveys Division is to survey, monument and map the Crown lands administered by the department and to maintain surveyed Crown land boundaries. It also has the following secondary objectives: to survey lands for purchase or expropriation; to provide a drafting and mapping service in support of departmental programs; to survey lands which the department wishes to protect for environmental, recreational or cultural purposes; to provide a surveying service to other government departments or agencies; and, to acquire aerial photography.

- The Provincial Crown Lands Record Centre (45 Alderney Drive, Queens Square, Dartmouth, Nova Scotia B2Y 4B9) coordinates and consolidates information related to all provincial land holdings for all government departments and agencies, including boards, corporations and commissions. It updates the Crown Lands Record and Resource Series Maps; films (microfilms) and stores related deeds, and leases; and provides statistical data for departments and agencies. These data are required to coordinate acquisition and disposal of land and to develop land use policies and plans.

  On request, the Provincial Crown Lands Record Centre also provides these types of statistical data and visual display material to the public and to federal or municipal departments and agencies.

Boards, Commissions and Agencies

- Nova Scotia Forest Practices Improvement Board

  Suite 210
  Queen's Square
  45 Alderney Drive
  Dartmouth, Nova Scotia B2Y 2N6

  This board is responsible for the administration of the Forest Improvement Act. This includes carrying out programs of education for good forest practice, making recommendations for cutting practices, and generally using its authority to encourage better forest management practices.

- Nova Scotia Pulpwood Marketing Board

  Suite 210
  Queen's Square
  45 Alderney Drive
  Dartmouth, Nova Scotia B2Y 2N6

  This board is responsible for administration of the Pulpwood Marketing Act. The purpose is to regulate the marketing of pulpwood on behalf of producers and buyers in the province.

Summary of Related Legislation

- BEACHES AND FORESHORES ACT, R.S.N.S. 1967, C. 19

  The Minister of Lands and Forests has the authority under this Act to grant or lease to any person any ungranted flat, beach or foreshore upon the coast of the Province. The Minister also has the authority to lease a beach, flat or foreshore for oyster cultivation and for the erection of fish traps or weirs.

- BEACHES PRESERVATION AND PROTECTION ACT, S.N.S. 1975, C. 6

  This Act was passed in 1975 to declare that all beaches in the Province of Nova Scotia are for the benefit, education and enjoyment of the people of Nova Scotia.

The Minister also has the authority under the Act to designate any property landward of the high water mark as a "protected beach". To date over 70 such beaches have been designated under the Act.

The Minister must grant permission to remove sand, gravel, stone and other materials from a beach. Any person who does not obtain this permission commits an offence and is liable to pay a fine of up to $1,000.00.

Regulations have been made pursuant to this Act further outlining what the Minister can do to preserve, control and manage beaches in the Province.

- BLUEBERRY ASSOCIATIONS ACT, R.S.N.S. 1954, C. 25

Under this Act any 10 persons over the age of 18 may form a Blueberry Association. This Association may apply to the Minister of Lands and Forests to set aside certain Crown lands as blueberry commons.

- BOWATERS MERSEY AGREEMENT ACT, S.N.S. 1962, C. 2

This Act authorizes the Minister of Lands and Forests to enter into an agreement with Bowaters Mersey Paper Company Limited regarding certain Crown lands in the districts around St. Margaret's Bay, Medway, Rossignol and Sissiboo-Tusket. (Agreement never executed).

- FOREST IMPROVEMENT ACT, R.S.N.S. 1967, C. 114

This Act was passed by the legislature in 1965 but was not fully proclaimed to be in force until December 1976. The Act provides for the maintenance, protection and rehabilitation of the forests throughout the Province so as to provide continuous and increasing supplies of forest products, to conserve water and prevent or reduce floods and to improve conditions for wildlife, recreation and scenic values.

The Act provides for the creation of a Provincial Forest Practices Improvement Board and enables Cabinet to appoint District Forest Practices Improvement Boards.

Tree felling practices may be recommended by the Board. The Act also provides for greenbelts along designated highways and rivers.

The Timber Loan Board is also set up under the Act. Regulations have been made with regard to this portion of the Act.

- INDIAN LANDS ACT, S.N.S. 1959, C. 3

The Minister of Lands and Forests was authorized to enter into and carry out an Agreement for the settlement of questions respecting Indian Reserve Lands.

The "reserve lands" transferred to the federal government are listed in the Appendix to the Act.

- KEDGEMAKOOGE NATIONAL PARK ACT, S.N.S. 1965, C. 10

This Act authorizes the Minister of Lands and Forests to expropriate lands in the Registration Districts of Annapolis, Digby and Queens County for national park purposes.

- LAND HOLDINGS DISCLOSURE ACT, S.N.S. 1969, C. 13

This Act came into force on 1 January 1970. Every non-resident individual who acquires land in Nova Scotia must "disclose" his or her ownership to the Registrar of Land Holdings (a public servant appointed by Governor in Council).

The Act excludes corporations which are incorporated under an Act of the Legislature of Nova Scotia, which hold a certificate under the Corporations Registrations Act, or which carry on business and have erected an office in the land holding.

The Minister of Lands and Forests may prosecute a non-resident or corporation for failure to provide a disclosure statement.

- LAND TITLES CLARIFICATION ACT, R.S.N.S. 1967, C. 13

The Governor in Council may designate an area in the Province as a "Land Titles Clarification Area" where the residents are in necessitous circumstances as a result of lack of property development and where there appears to be confusion as to the ownership of land.

Twelve areas have been so designated throughout the province. The Minister of Lands and Forests may issue a "Certificate of Title" to individuals claiming land within the designated area provided certain criteria are met.

- LANDS AND FORESTS ACT, R.S.N.S. 1967, C.163 (as amended)

The Lands and Forests Act was first passed by the Legislature in 1926. Under the Act, the Minister of Lands and Forests has under his supervision, direction and control:

(a) the management, lease, sale and other disposition of Crown lands -- Part I of the Act;

(b) the conservation and protection of all forests and timber lands whether the same are Crown lands or are privately owned -- Part II of the Act;

(c) the protection, preservation and propogation of game and fish -- Part III of the Act.

Part I also deals with trepasses on Crown lands, and authorizes the Minister to issue timber cutting licences. Part II makes the Minister of Lands and Forests responsible for the fighting of forest fires throughout the Province. Part III provides that the Minister of Lands and Forests may, subject to Cabinet approval, pass regulations relating to the taking of wildlife throughout the Province and to the enforcement of hunting provisions of the Act and Regulations.

- NOVA SCOTIA PULP LIMITED AGREEMENT ACT, S.N.S. 1958, C. 9

The Act provides that the Minister of Lands and Forests be designated the Minister in relation to agreements signed with the company, including the Water Agreement and the License and Management Agreement relating to the Crown lands in the seven eastern counties of the Province.

- PARKS DEVELOPMENT ACT, R.S.N.S. 1967 C. 222

This Act provides that the Minister of Lands and Forests may grant financial assistance to municipalities up to a maximum of $15,000.00 for the purpose of developing an approved campsite in the municipality. The Minister of Lands and Forests may also grant financial assistance up to a maximum of $2,500.00 to assist a municipality or local community organization in the development of a local scenic area.

- PROVINCIAL PARKS ACT, R.S.N.S. 1967, C. 244 (as amended)

  The Minister of Lands and Forests is given the power under this Act to purchase, expropriate or otherwise acquire lands for park purposes.

  The Minister is responsible for the control, management and maintenance of these parks.

  Regulations have been made and are enforced by the Department of Lands and Forests relating to activities inside the parks.

- PULPWOOD MARKETING ACT, S.N.S. 1977, C. 15

  This Act establishes a Pulpwood Marketing Board consisting of 5 members appointed by Governor in Council. The Board has the power, inter alia, to register any association as the bargaining agent for all or any group of producers or buyers of pulpwood and to investigate the cost of marketing, producing or distributing and transporting any pulpwood.

  The Minister of Lands and Forests is responsible for the Act and the regulations made pursuant to it.

- SCALER'S ACT, R.S.N.S. 1967, C. 277

  The Minister of Lands and Forests is responsible for the administration of this Act. A Board of Examiners consisting of 3 persons is set up under this Act to examine candidates for licenses as scalers.

- SCOTT MARITIMES PULP LIMITED AGREEMENT ACT, S.N.S. 1965, C.15

The Minister of Lands and Forests is authorized to enter into, execute and carry out this agreement passed by the legislature in 1965. This Act provides for the licensing of certain lands to the company and the forest management that is to be carried out by the company on these lands.

- SURVEY'S ACT, S.N.S. 1970-71, C.20

This Act has not been proclaimed to date.

Under this Act, the Minister of Lands and Forests is responsible for the administration of the Act and he may establish and maintain a coordinate survey system.

- TRAILS ACT, S.N.S. 1978, C.16

This Act has not been proclaimed to date.

The Act provides for the designation of land as provincial trails in order to provide a network of trails in the province for public recreation.

Once a trail is designated, the rights and liabilities of the owner over whose land the trail passes are defined.

The method of designating a trail is outlined in the Act. The Minister may make regulations under the Act and make provisions for the enforcement of both the Act and Regulations.

GLOSSARY
OF SELECTED TERMS

GLOSSARY OF SELECTED TERMS

Accessibility The ease with which standing timber can be felled and extracted.

Age The number of annual growth rings between the bark and the centre of the tree at breast height (breast height age) at stump height (stump age).

Age Class The interval into which the age range of trees, stands or forests is divided.

All-aged Applied to a stand in which trees of all ages up to and including those of the felling age are found.

Alkaline soil Any soil showing an aklaline reaction or with a pH greater than 7.

Allowable Cut The amount of wood which may theoretically be harvested under management for a given period (annually or periodically) from a specified area.

Anadramous Fish species that migrate upstream to breed.

Annual ring The layer of wood produced by the growth of a single year which in cross section appears as an annual ring. The spring wood of faster growth is light. The summer wood of slower growth is darker, harder and stronger.

Aspect The direction towards which a slope faces.

Bag Limit The total number of a species (or group of species for ducks) that may be taken by a hunter (trapper, fisherman) per day or per season.

Barren Land that bears no trees or only stunted trees.

Basal area The area in square metres (square feet) of the cross section at breast height of a single tree or of all the trees in a hectare (acre).

Board foot A measure equal to 1" x 12" x12".

Breast height 1.3 metres (4.5 feet) above the average ground level.

Browse Leaves, twigs and young shoots of trees or shrubs which animals feed on.

Canopy The cover of branches and foliage formed by the tree crowns.

Carrying Capacity Maximum population of animals which a particular habitat or range can support.

Cleaning A cutting made in a stand not past the sapling stage, to free the best trees from undesirable individuals of the same age and size which overtop them or are likely to do so, or to reduce stocking to a recommended level.

Clearcutting The removal of the entire standing tree crop.

Climax The culminating stage of a natural forest succession for a given environment, the vegetation having reached a highly stable condition. Sugar maple, yellow birch, beech and hemlock are considered to be climax species in Nova Scotia. Such species are shade tolerant.

Codominant trees Trees with crowns forming the general level of the crown cover and receiving full light from above but comparatively little from the sides, usually having medium sized crowns more or less crowded on the sides.

Cord, standard A stack of wood containing 128 cubic feet.

Crop tree Any tree forming, or selected to form, part of the final harvest--generally a tree selected in an immature stand for carrying through to the final harvest.

Crown The branches and foliage of a tree.

Crown canopy The more or less continuous cover of branches and foliage formed collectively by the crowns of trees.

Crown closure The percentage of ground area covered by the vertically projected tree crown areas.

Cruise A survey to locate and estimate the quantity of timber on a given area according to species, size, quality, possible products or other characteristics.

Cull A tree or log of merchantable size, rendered unmerchantable because of poor form, limbiness, rot or other defect.

Cunit 100 cubic feet of solid wood.

Cutting cycle The planned interval between major felling operations in the same stand.

Decadence Deterioration, degeneration of trees and stands due to age.

D.B.H. See diameter at breast height.

Decay The decomposition of wood substance by fungi.

Defect Any irregularity or imperfection in a tree or log that reduces the volume of sound wood or value of the log.

Density, stand An indicator of how fully the site is occupied by trees. Expressed as basal area per hectare (acre), it is a measure of the portion of area occupied by stems. Expressed as percent of crown closure, it is an estimate of how well the site is used.

Depredator An animal whose feeding or other activities are inimical to humans.

Desirable species All species stated in the Forest Improvement Act and such other species which the Provincial Forest Practices Improvement Board subsequently includes as desirable species for any District.

Desirable stand A stand having more than 50% of its merchantable volume in healthy desirable species.

Diameter at breast height The diameter of a tree, outside bark at 1.3 metres (4.5 feet) above average ground level.

Diameter limit The smallest size to which trees are to be cut. Differs from species to species and is measured 30 centimetres (1 foot) above average ground level outside bark.

Dieback Progressive dying from the extremity of any part of a plant which may or may not result in its death.

Dominant trees Trees with crowns extending above the general level of the crown cover and receiving full light from above and partly from the side; they will be larger than the average trees in the stand, and with crowns well developed but possibly somewhat crowded on the sides.

Ecology The study of the relations of living things to one another and to their environment.

Ecoregion A region that differs from another region by specific ecological conditions.

Ecosystem All living things and their environment in an area of any size that we isolate for study. All the living things are linked together by energy and food flow.

Environment The aggregate of surrounding things (living and non-living), and the conditions or influences which impinge upon them.

Ericaceous Describing a family of shrubs or bushes popularly known as heath plants--Ericaceae.

Even-aged Applied to a stand in which relatively small age differences exist between individual trees.

Fauna The animal life.

F.B.M. (f.b.m.) Feet Board Measure, or number of board feet: a measure of volume of sawn lumber (see Board feet).

Forest A complex community of plants and animals in which stands of trees are the most conspicuous members.

Forest Management The practical application of scientific, economic and social principles to the administration of a forest property for specified objectives.

Game, Big Includes deer, moose, bear.

Game, Small Includes rabbit (snowshoe hare), ruffed grouse, cock pheasant, Hungarian partridge, woodcock, Wilson's snipe, geese and ducks, including sea ducks.

Group selection A modification of the selection method whereby the mature timber is removed in small groups of trees rather than by single trees.

Habitat The natural home of environment of a plant or animal.

Herbaceous Describing seed producing plants that do not develop persistent woody tissue above ground. Includes herbs and grasses.

Herbicide A chemical compound used to kill plants selectively.

Highgrading Selective cutting, a type of exploitation cutting that removes certain species, above a certain size, and of high value with sustained yields being wholly or largely ignored or found impossible to fulfill.

Hummock A hillock or mound.

Hypoxylon A fungus-induced canker of various deciduous trees, notably the aspens.

Increment The increase in girth, diameter, basal area, height, volume, quality or value of individual trees or crops. Refers mainly to past radial increase as measured from the annual growth rings. Current Annual is for a given year. Mean Annual is the average annual growth for the total age.

Instar The form assumed by an insect during a particular stage in its development which is imitated and/or terminated by the shedding of skin.

Integrated Multiple Use A form of land resource used where various interests are integrated by mutual consent to best serve the best interests of all users.

Intermediate trees Trees with crowns below, but still extending into the general level of the forest canopy, receiving a little direct light from above, but none from the sides; these trees usually have small crowns that are shaded on all sides.

Inventory A stock-taking of forest volumes by means of aerial mapping and sampling on the ground to arrive at estimates of volume, growth and drain by selected categories.

Intolerant species Those trees which cannot persist under the shade of other trees.

Larva An immature insect that emerges from the egg differing in form from the adult into which it develops via the pupal stage. ("Worm" is a loose colloquial synonym.) It is usually the stage in the life cycle of an insect that does the most damage to forest trees.

Nurse Crop A layer of shrubs or young hardwoods which is utilized by softwood regeneration as protection from the elements until the latter becomes hardy enough to grow in the open.

Overmature The period in its life cycle when a tree or stand is declining in growth and/or value.

Party-Nights A term used in compiling recreational statistics to express numbers of nights spent in camping areas by groups of people.

Patch Cutting A variation of the clearcutting system whose removals leave small, irregular openings.

Pesticide Any means, usually chemical or biological, used to control or destroy organisms which people consider harmful.

Pioneer species A plant capable of invading bare sites and persisting there until supplanted by succession species.

They usually promote the establishment of more exacting species. Poplar, aspen, white birch and willow are pioneer trees.

Pole A young tree, from the time its lower branches begin to die, up to the time its rate of height growth begins to slow down and crown expansion becomes marked. The tree has a diamater at breast height of not less than 10 cm. (4 in.) and not more than 20 cm.(8 in.)

Pulpwood Wood cut and prepared primarily for manufacture into wood pulp.

Pupa An immature, generally immobile, insect stage between larvae and adult.

Radial suppression The process whereby growth on a side of a tree stem is reduced (suppressed) because of competition with its neighbours.

Reforestation The artificial establishment of forest on an area.

Refuge See Sanctuary.

Regeneration The process by which a forest is renewed.

Rotation The period of years required to establish and grow timber crops to a specified condition of maturity for regeneration cutting--from harvest cut to harvest cut.

Roundwood Wood in the round--before being processed.

Sanctuary An area of land designated by government where animals cannot be killed.

Sapling A young tree no longer a seedling but not yet a pole, i.e. greater than 1 metre (3 feet) tall but less than 9 cm. (3.6 in.) in diameter at breast height.

Sapwood The living wood of pale colour next to the bark. The sapwood is the wood first formed by the cambium. It conducts mineral solutions from the roots to the leaves, and assists in food storage.

Sawlog A log considered suitable in size and quality for producing sawn timber.

Sawtimber Trees suitable in size and quality for producing sawlogs.

Scaling Measurement of forest products for purposes of payment.

Scarify To break up the forest floor and topsoil preparatory to regeneration.

Scrub growth Inferior growth consisting of small and stunted trees or shrubs of low economic potential.

Season The period during which an animal may be hunted (trapped or fished).

Seed year In respect of any species, particularly trees of irregular or infrequent seed production, the year in which it produces, either as an individual or as a stand, an adequate amount of seed. Many periodic seeders produce heavy ("bumper") crops during their seed years.

Selection cutting The periodic removal of trees, individually or in small groups (group selection) from an unevenaged forest in order to realize the yield and establish a new crop of irregular constitution. The improvement of the forest is a primary consideration.

Selective cutting See high-grading.

Shelterbelt A strip of living trees and/or shrubs maintained mainly to provide shelter from wind, snowdrift, sun, etc.; under some conditions may be called a windbreak.

Shelterwood cutting Any regeneration cutting in a more or less regular and mature stand, designed to establish a new stand under the protection of the old. Also called Shelterwood system, an even-aged silvicultural system in which, in order to provide a source of seed and/or protection for regeneration, the old stand (the Shelterwood) is removed in two or more successive cuttings, the first of which is ordinarily the seed cutting (though it may be preceded by a preparatory cutting), and the last, of which is the final cutting. Any intervening cutting is termed removal cutting. The lengths of the regeneration interval and the regeneration period determine the degree of uniformity in age of the resulting stand.

Silviculture The science and art of cultivating forest crops. More particularly, the theory and practice of controlling the establishment, composition, constitution and growth of forests.

Site An area, considered as to its ecological factors with reference to capacity to produce forests or other vegetation; the combination of biotic, climatic and soil conditions of an area.

Soil Profile The different layers which appear on a vertical section through the top few feet of undisturbed soil, used by forest managers to infer growth potential for trees.

Sprout Any shoot arising from above ground level, usually from a stump or stem.

Stagnant Stands in which growth and development have all but ceased due to poor site and/or overstocking.

Stand A community, particularly of trees, possessing sufficient uniformity as regards composition, constitution, age, spatial arrangement or condition, to be distinquishable from adjacent communities, so forming a silvicultural or management entity.

Strip Cutting A variation of clearcutting where narrow strips are cut, leaving intervening strips to seed in the openings.

Stumpage The value of timber as it stands uncut in the forest. Standing value.

Sucker Any shoot arising from below ground level usually from a root.

Suppressed trees Trees with their crowns entirely below the general forest canopy which receive no direct light either from above or from the sides.

Sustained yield Implies continuous production with the aim of achieving an approximate balance between net growth and harvest.

Thinning Cutting in an immature stand to improve quality, to improve species composition, to obtain greater merchantable yield, and to recover material that may be otherwise lost.

Tolerant species Those trees which can persist and grow, perhaps slowly, under shade of other trees.

Type A descriptive term used to identify areas in similar composition, development and growth.

Ungulate A member of the deer family; in Nova Scotia, deer or moose.

Weeding A cultural operation eliminating or suppressing undesirable vegetation during the initial period of a plantation.

Wildlife Any non-domesticated vertebrate animal, including fish.

Wildlife Management Any policy legislation or program of government to protect, control, enhance, perpetuate, use or allocate wildlife.

Wildlife Management Area An area of land designated by government with unique laws regarding use by people and/or the taking of animals.

Windfirm Trees able to stand strong winds--to resist windfall.

Windthrow A tree or trees uprooted by the wind.

Part 1

Forestry

1

Background

1. BACKGROUND

If there is one feature which has always characterized the forests of the Maritime Provinces, it is diversity. In Nova Scotia this effect is especially pronounced, for three reasons. Firstly, the peninsula is a meeting ground for some 20 deciduous species from the south and 10 boreal species from the north. This situation is accentuated by its 600-kilometre projection to the northeast, which brings its eastern extremities under the influence of the cold Labrador Current, while the western counties enjoy some tempering effects from the Gulf Stream. Secondly, our unusually wide range of geological formations (for so small a province) has produced a corresponding range of soil and topography, further modified by at least three successive glaciations. Thirdly, there is the impact of over two centuries of use by man.

The net result is a patchwork of forest types so interwoven that, except in the relatively uniform coniferous forest on the Cape Breton Highlands, it is difficult to find more than 20 hectares (50 acres) of a single forest type anywhere in the province.

Early Exploitation

Although for the aboriginal inhabitants the forest was essential for life, their small numbers--a few thousand at most--precluded their making any major impact upon it. And even the first European settlers, namely Champlain's colonists at Port Royal and the Acadians around the Basin of Minas, made few inroads, for the French relied on the dyking of tidal marshes to create new farmland.

It was only with the removal of the Acadians by the British in 1755 and their replacement by New Englanders in the 1760's that land clearing began in earnest. Between 1760 and 1763, 4,500 farmers and fishermen settled in the Annapolis and Cornwallis Valleys. A further surge of activity followed the American Revolutionary War, when Lord Dartmouth instructed Governor Legge of Nova Scotia to throw Crown lands open to absorb the expected influx--a step that was to have far-reaching effects on tenure. Upwards of 22,000 refugees, disbanded troops and Loyalists flooded into the province.

Meanwhile, the founding of Halifax in 1749, followed by Dartmouth, Lunenburg, Mahone Bay and Lawrencetown, led to increasing demands for timber. Large old-growth stands along navigable waterways were the first to be exploited. By 1767 there were at least 27 sawmills, 15 of them concentrated in Annapolis, Liverpool and Lunenburg. Soon these mills were cutting planks or deals not only for local markets, but for export to Newfoundland, England, the West Indies, Bermuda and South America.

By 1839 there were over 1,400 sawmills employing some 3,000 men. There were also 130 shingle mills, six lath mills, one paper mill and a number of planer mills. All these were run by water; our first steam mill did not appear until 1845.

Meanwhile, another international event was to propel Nova Scotia into prominence in the ship-building and lumber business. In 1799 British imports of timber from the Baltic were about five times those from all of British North America. But in 1807 Napolean blockaded the Baltic ports, forcing Britain to turn to her colonies. In the fall of 1808, in one day alone, there were 26 square-rigged ships loading timber in Pictou Harbour. Between 1800 and 1818. annual shiploads of Nova Scotia fir and oak timber rose from 604 to 28,082.

In 1824 the Huskisson Act permitted the colonies to trade with foreign countries as well. Between 1831 and 1838 a thousand vessels measuring nearly 100,000 tons were built and registered in the province. For a time we had the highest per capita tonnage of registered shipping in the world.

But by the late 1800's competition from steamships and iron hulls was squeezing Nova Scotia out. Fortunately lumber was still in steady, if fluctuating, demand--although good big trees were getting harder to find. Fortunately too, small trees were about to come into their own.

Other Forest Influences

Although land-clearing and prolonged harvesting has had a profound modifying effect on Nova Scotia's forest resource, other man-related influences have played their part, especially fire, insects and disease. While repeated cutting had the effect of slowly increasing the proportion of aggressive, short-lived species such as balsam fir and red maple, fire and pests tended to speed this process.

Simeon Perkins filled pages of his diaries with descriptions of uncontrollable fires threatening Liverpool in the late 1700's. Bernhardt Fernow's 1912 report, Forest Conditions of Nova Scotia, refers to various conflagrations (e.g. between Jordan and Roseway Rivers around 1820; Stewiacke area, 1849; Cumberland County, 1875; northeastern Shelburne County, 1903; and so on). Coal-burning locomotives were notorious fire-starters. Not until the 1940's did preventive and control measures gradually take effect. In the wake of such repeated fires, large areas of pioneer hardwoods such as aspen and birch sprang up, especially in the eastern counties, only to give way to even-aged stands of spruce and fir. Some areas, notably the drier granitic sites of the western counties, were permanently degraded to heathland and rock barren.

Introduced fungi and insects wrought less dramatic changes. White pine blister rust, imported on nursery stock in the 1900's, degraded our few remaining white pine stands. In the 1930's, stands of beech, once a fairly abundant component of the ancient Acadian forest, were severely depleted by beech bark disease which entered via Halifax around 1890. Other hardwoods tended to fill the biotic vacuum. Balsam woolly aphid, arriving from Europe some time before 1910, slowly stunted the growth of many eastern fir stands. The introduction of white-tailed deer around the turn of the century, and its subsequent population explosion in the 1940's, further altered the forest vegetation--one species of shrub, namely Canada yew, was decimated. Finally, a native insect, the spruce budworm, proved to be the most powerful influence of all, consuming at fairly regular intervals whole tracts of overmature spruce and fir, so that they reverted to immature stands which in turn became fodder for the same insect a few decades later. The natural increase of fir after harvesting and of white spruce after farm abandonment have exacerbated this problem.

The impact that is hardest to quantify is genetic degradation. That this occurred seems almost certain, considering the extent of highgrading at every stage of forest exploitation in the past--first the best pine for masting timber, then the best pine and spruce for select deal logs, finally the best softwood stands for prime lumber and pulpwood. The effect has been to leave, as breeding stock, inferior specimens. Thus the longer-lived, shade-tolerant pine, sugar maple, yellow birch, hemlock and red spruce that were the main components in the original forest were degraded.

The Modern Era

With rising demand for newsprint, Canadian papermakers of the early 1800's had been finding it increasingly difficult to obtain enough rags, which were the primary feedstock at that time. The newsprint mill at Bedford was no exception. But in 1844 Charles Fenerty of Lower Sackville demonstrated a new way of making pulp by grinding wood. In Germany another inventor hit upon the same idea around the same time. Nova Scotia's first load of pulpwood was delivered to the St. Croix mill near Windsor around 1875. In the next few years five more small pulpmills were built. One made wrapping paper from groundwood, pulp and rags from

1897 to 1908; another made newsprint in 1911 and 1912. The next step, chemical pulping of wood, came when Canada's first sulphite mill went on stream at Sheet Harbour in 1885.

Unfortunately all of these mills suffered reverses of one kind or another. Even if all of them had been active at the same time, they would have consumed no more than 100 000 m^3 (45,000 cords) a year.

More important at this stage was the export trade . This began after the American-owned Oxford Paper Company leased 350,000 acres of woodlands in Cape Breton Island in 1899. The understanding was that they would build two pulpmills in the area. Those mills were never built, but the company did erect a rossing mill and began exporting debarked pulpwood to the United States.

Meanwhile, as domestic markets opened, other industries using small wood developed. During the post-war boom of the 1920's mine timbers, barrels, boxes, shingles and fuelwood were all in heavy demand, as was also studwood for housing construction.

In 1924 another American company built a 100-cord-a-day groundwood pulpmill at Sheet Harbour, replacing the earlier mill which had burned. Two years later the Minas Basin Pulp and Power mill was constructed at Hantsport, followed in 1929 by the first large mill, Mersey Paper's newsprint operation in Liverpool (now Bowater Mersey Paper Co. Ltd.). Because the new mills had a much greater capacity and exported a more finished product, their impact on the province's economy was pronounced. With the addition in the 1960's of two more large mills (Nova Scotia Pulp Ltd., at Port Hawkesbury, 1960; Scott Maritimes Pulp Ltd. at Abercrombie Point, 1967), plus a hardboard plant at East River in 1966 (now Masonite Canada Ltd.), the demand for pulpwood ballooned. In fact, after mill expansions in the early 1970's, annual wood consumption by the pulp and paper sector increased to more than 75% of the total harvest.

Toward Forest Management

As early as 1784 Charles Morris, Surveyor General of Nova Scotia, reported very few pines in central Nova Scotia suitable for masts and spars. His contemporary John Nutting said the same of eastern Nova Scotia. In 1802 Titus Smith found wide evidence of fire, blow-down and cutting. Fernow in 1912 warned of possible lumber shortages unless remedial measures were taken.

The establishment in 1926 of the Department of Lands and Forests and the passage of the Lands and Forests Act covering Crown lands (Part I), Forests (Part II), and Game (Part III), marked the beginnings of reforestation and forest fire control.

No concrete action toward forest regulation was taken until after World War II, when lumberman of the western counties, alarmed by overharvesting during the war, petitioned the government for laws to protect the supply of sawlog material. What is popularly called "The Small Tree Act" of 1946 resulted. Its main feature was the minimum diameter limit--a primitive and self-defeating regulatory tool unless expertly administered, because it tends to highgrading by assuming that smaller trees are younger, when in fact they may be past maturity. This statute was replaced in 1965, by the Forest Improvement Act with provision for district advisory boards answering to a provincial board.

After the second World War real progress was made in forest fire detection and control. Lookout towers were set up in all counties, followed by an aerial surveillance and radio communications system. A network of fully equipped depots with all necessary firefighting equipment was established.

The next thing was to obtain better information about the resource. The only systematic forest stock-taking had been done by Bernhardt Fernow for the Province in 1909-10. With funding assistance from the Federal Government, the province instituted its first comprehensive, cyclic forest inventory in 1953. Fed by data from new aerial photography, regular sampling and plot remeasurement, it provided for the first time a continuing flow of maps and data on the changing resource. This inventory, since refined, is now being maintained on a 10-year cycle.

The Agricultural Rehabilitation and Development Act of 1962 subsequently provided for cost-shared federal-provincal forestry programs which permitted considerable progress in improving forest access and in creating a consciousness of the need for forest management.

Prior to the expiry of the ARDA III Agreement in 1976, the province and DREE entered into negotations for a Subsidiary Agreement in June 1977. The Subsidiary Agreement provided for a comprehensive forest management program which has been described as the best of its kind in Canada. That program has now been succeeded by the Forest Resource Development Agreement signed on August 31, 1982. The new agreement provides for complementing programs to be implemented directly by either the Department of Lands and Forests or the Canadian Forestry Service over the next five years.

Summary

For climatic and geological reasons Nova Scotia has an unusually diverse forest for its area, ranging from extensive tracts of sub-arctic spruce-fir-birch on the Cape Breton Highlands and along its coasts, to temperate deciduous species on its interior lowlands, and a great variety of intermixtures. This diverse forest, despite two centuries of use and abuse, chiefly through landclearing, shipbuilding, lumbering and pulpwood harvesting, and despite the harmful effects of wildfire and pests, remains reasonably productive.

With the setting up in 1926 of a Department of Lands and Forests, and the promulgation of an Act by the same name to control cutting and to prevent wildfire, the stage was set for a more progressive use of the resource.

After World War II forest managers were quick to take advantage of the wartime technologies of radio communications, aircraft patrol and aerial photography. Greatly improved forest fire control and forest inventory methods resulted.

In the late 1960's three new fibre mills were established to utilize surplus wood. During the same period the Small Tree Act of 1946 was replaced by the Forest Improvement Act--although the latter was never fully implemented. In the early 1970's spruce budworm inflights from New Brunswick, followed by massive population buildups and damage in certain areas, brought on confrontations among forest managers, politicians and environmentalists over what to do. This debate continues.

In 1962, 1977 and 1982, federal-provincial agreements made possible cost-shared programs for the management and rehabilitation of the resource.

2

Nova Scotia Forest Resources

2. NOVA SCOTIA FOREST RESOURCES

Forest Inventories

The first forest inventory in Nova Scotia was conducted in 1801-02 by naturalist Titus Smith. This was a walking survey of the mainland over the course of two summers. Smith submitted a report of his observations to the colonial government.

In 1912, B. E. Fernow concluded a second inventory. This inventory was the first to provide data of the type one would expect today and the first to cover the whole province. Forest type maps were prepared also for the first time.

During the period 1953-57 a third province-wide inventory was completed under a federal/ provincial agreement. This inventory provided forest type maps from air photo interpretation, as well as statistical data from sample plots. It was conducted by a consulting firm under contract to the Province.

In 1965 the fourth inventory was started. The intent this time was to make the inventory continuous, to complete the province in 7 years and then to start over again, whereby no data would be older than 7 years. New forest type maps were made from air photo interpretation. The land was categorized as to Crown, large private, small private, allowing the data to be summarized. The establishment of permanent sample plots was also started. These plots were to be remeasured every 5 years to obtain data on growth and mortality. To date all plots have been remeasured twice, and the fourth measurement is about 40% complete.

The next cycle, started in 1972, was increased to 10 years. However, because Cape Breton was not inventoried due to the on-going spruce-budworm-caused mortality, this inventory terminated in 1980. New forest type maps were made, but for Crown land only. This was due to the fact that a more detailed classification system was being used and staff with expertise to do the work was very limited. This mapping is still on-going and will be completed in 1983. The primary purpose is to provide data for management planning on Crown land. Similar forest type maps are being produced for private lands where plans are being made for private landowners.

In 1981 the sixth inventory started. This inventory was integrated with a wildlife habitat inventory.

The inventory completes 1 or 2 counties each year. The inventory is not intended as a management inventory (ie. inventory of each stand). It is intended to be used for overall planning purposes and can be used on an ownership category within a county. Further subdivision of data is possible, but with less and less reliability due to normal sampling error.

The data are obtained from sample plots established by staff in properly selected stands. From these plots data on tree species, diameters, heights, products, stand classification, etc. are obtained. These field measurements are compiled to produce estimates of volume by product, by species, ownership, forest type and expanded to cover all stands in the county. Then counties are combined for provincial estimates.

Each inventory has seen changes to reflect new technology in data processing, user needs and new sampling techniques. Generally, each inventory has become more sophisticated than its predecessor. The Department is continually searching for new and better sampling techniques to provide more reliable data to decision makers at reasonable cost. These are tested and the most useful are implemented. For example, the use of satellite imagery to plot and calculate annual cutover areas is being explored for possible adoption .

Forest Resources Data

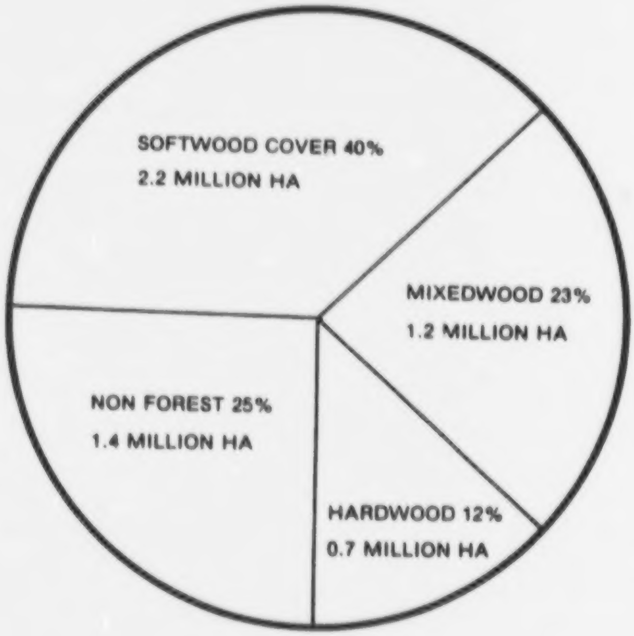
Provincial Picture:

As described above, comprehensive information on the forests of the province is gathered through the ongoing forest inventory and related studies. Except for data on growth and mortality, the data in most cases predates the current spruce budworm infestation and does not reflect the very significant losses that are known to be occurring.

The province contains a land and water area of 5 500 000 ha (13.7 million acres), of which 4 100 000 ha (10.2 million acres) are forested (Figure 1) This is derived from the most recent forest inventory and is based on a random sample of forest lands. The previous inventory cycle yielded a figure

FIG. 1

AREA CLASSIFICATION IN PERCENT



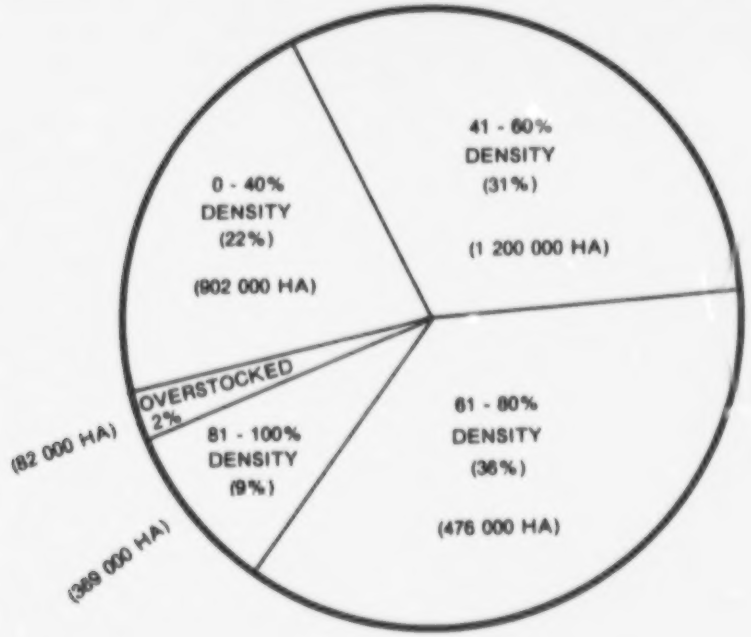
LAND AND WATER AREA 5.5 MILLION HECTARES
FOREST AREA 4.1 MILLION HECTARES

of 4 400 000 hectares. The difference is attributable to normal sampling error. For the purposes of forest management (Class 5 CLI or better) approximately 92% of the forested area is considered productive.

The forest of Nova Scotia can also be divided into Density Classes. Density is defined here as a quantitive measure of tree cover on an area (Figure 2), reflecting density in terms of basal area of trees.

FIG. 2

PERCENT AREA BY DENSITY CLASS



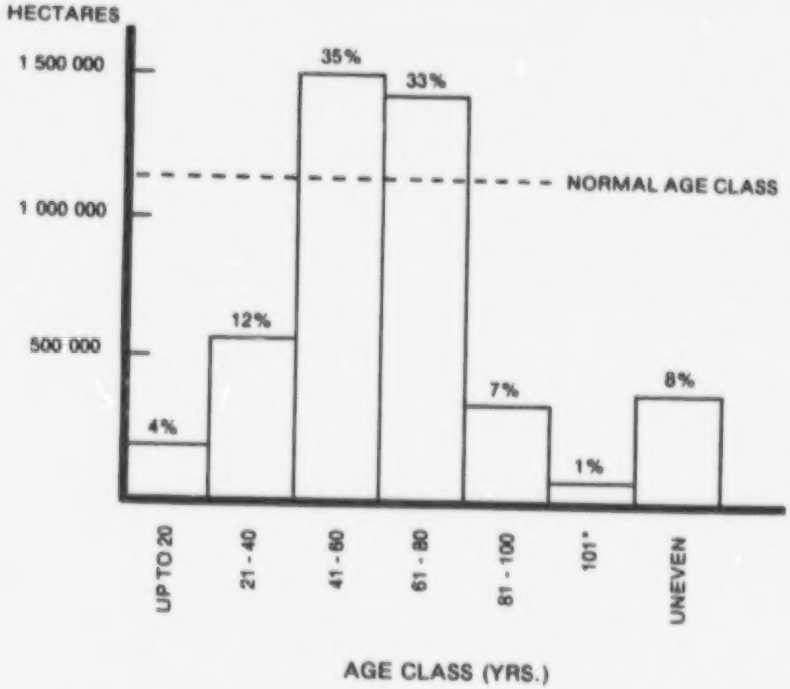
Over 53% of our forest has less than 60% stocking; in other words, 2 000 000 ha (4.9 million acres) of our forest land is under-productive. Some of this land is lacking regeneration; some has an older forest that is sparsely stocked and of poor quality. As a result it is commercially inoperable, and needs salvage and planting.

One of Nova Scotia's problems is its unbalanced age class distribution. Figure 3 presents this in 20-year age classes. These show that the province's forests have 41% of area in mature to over-mature stands with another 35% that will be in these categories within the next 20 years, accounting for 76% of our forests.

The ideal would be to have an equal area in each age class up to maturity (i.e. 80 years). The line on the chart indicates what an even distribution would look like (i.e. 51 210 ha in 80 one-year age classes or 1 025 000 ha in each 20-year age class). Because of the relatively small area in younger stands, there will be insufficient area available for harvest in later years.

FIG. 3

AREA AND AGE CLASS DISTRIBUTION



The province contains 193 000 000 m^3 (87 million cords) of softwood species (Figure 4) and 87 000 000 m^3 (39 million cords) of hardwood species (Figure 5).

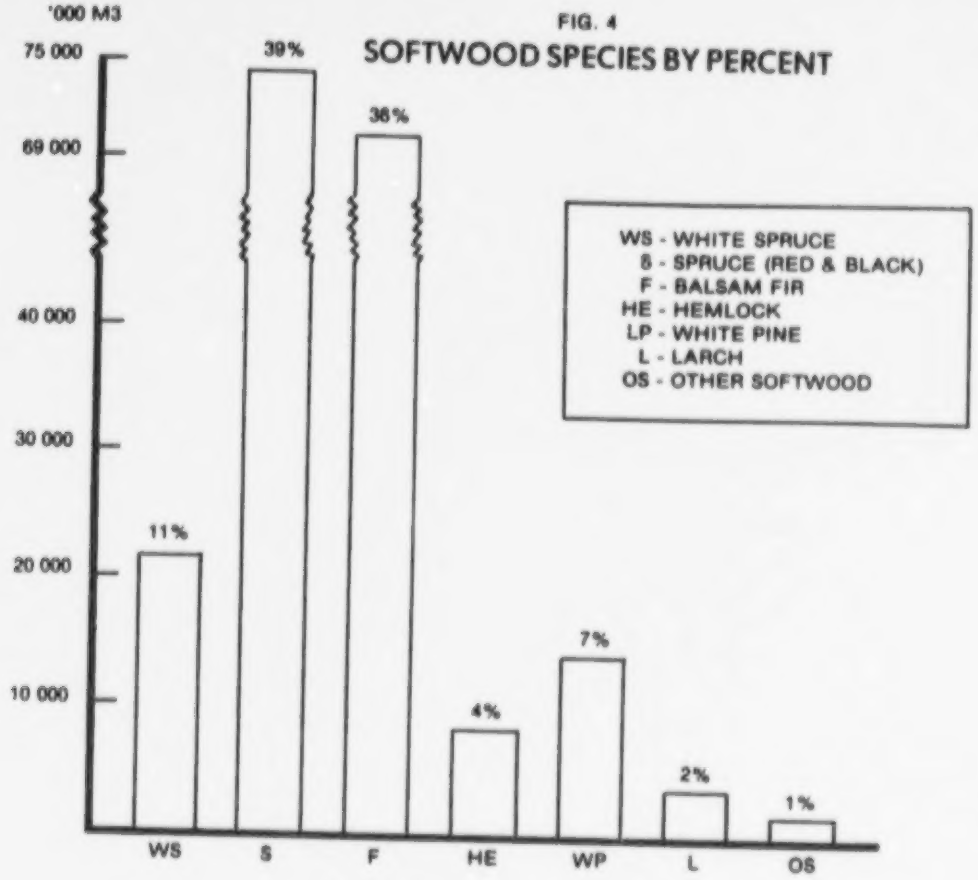
Overall, softwood species make up 69% and hardwood species 31% of the total growing stock by volume.

Of equal importance to age structure is the quality of material in our forests; ie., products that are available. The breakdown for products is depicted in Figure 6, based on these 7 categories:

Softwood Sawlog	-	tree 21.8 cm (8.6") + DBH to 19.0 cm (7.5") top and of sawlog quality.
Hardwood Sawlog	-	tree 24.4 cm (9.6") + DBH to 19.0 cm (7.5") top and of sawlog quality.
Undersized Sawlog	-	softwood trees 16.7 cm - 19.0 cm (6.6" - 7.5") DBH to 9.1 cm (3.6") top and of sawlog quality.
Boltwood	-	hardwood trees 16.7 cm - 24.1 cm (7.5" - 9.5") DBH to 14.2 cm (5.6") top and of suitable quality.
Pulpwood	-	trees not suitable for any of the above 9.1 cm (3.6") + DBH top.
Cull	-	material not suitable for any product.
Topwood	-	material between top diameter for sawlog or boltwood and a 9.1 cm (3.6") top.

FIG. 4

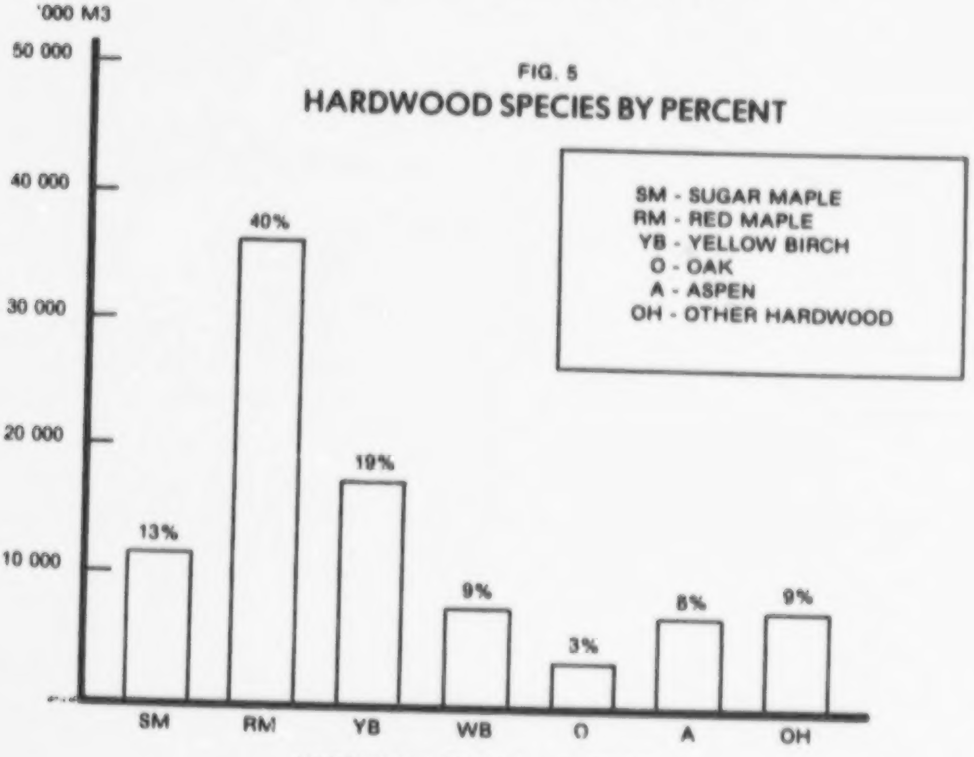
SOFTWOOD SPECIES BY PERCENT



SOFTWOOD VOLUME = 193 000 000 m3

FIG. 5

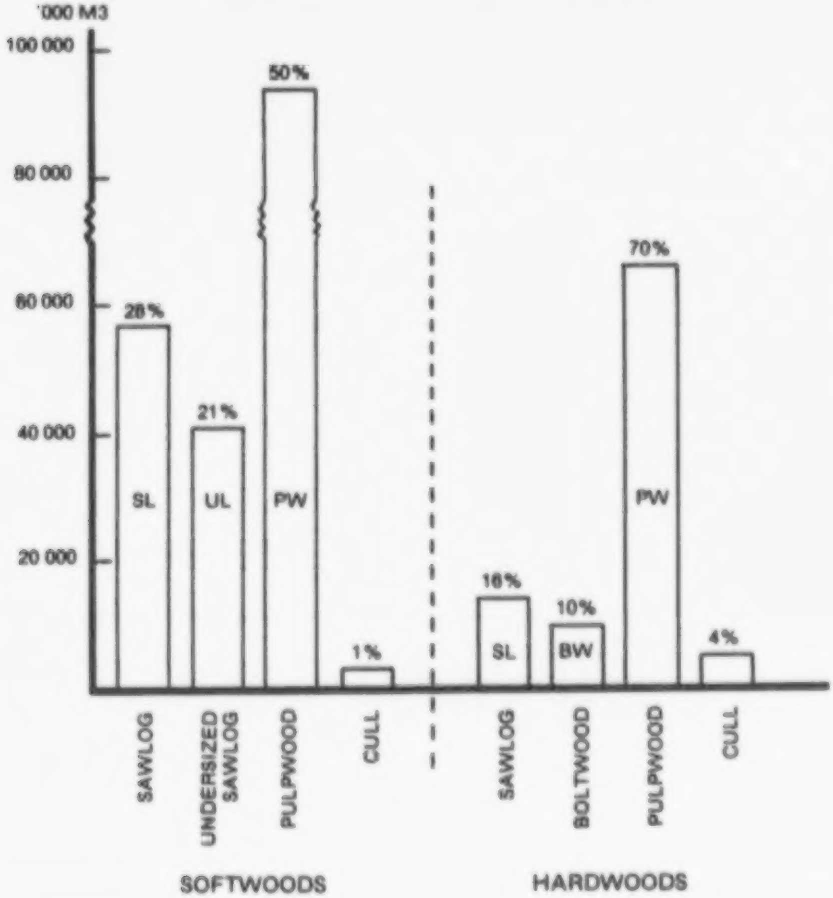
HARDWOOD SPECIES BY PERCENT



HARDWOOD VOLUME = 87 000 000 M3

FIG. 6

FOREST RESOURCE BY PRODUCT

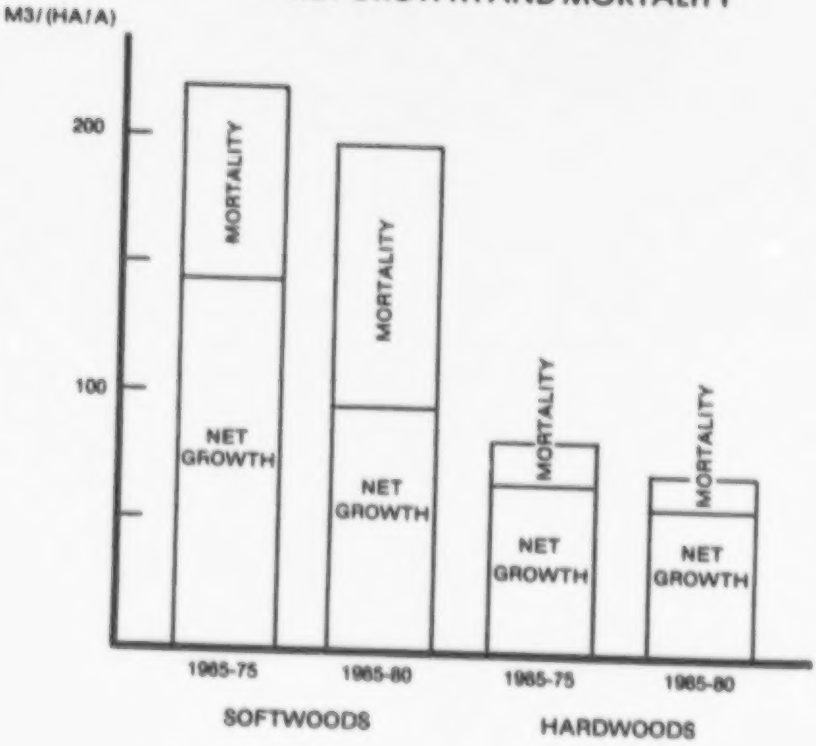


An important factor in our forest resource is our growth and mortality rate. These factors relate to age class structure, to species and to incidence of pests.

Figure 7 shows mortality and growth, comparing data for 1965-75 and 1965-80. There has been a 38% increase in mortality and a 33% decrease in net growth for softwood. The areas of budworm infestation, i.e. Cumberland County and the eastern region account for the increase in mortality; the rest of the province shows little if any change.

FIG. 7

NET GROWTH AND MORTALITY



At the present level, the softwood mortality amounts to 4 300 000 m^3/a (1.9 million cords annually) and between 1965 and 1980 (ie., 15 years) we have lost 64 500 000 m^3 (29 million cords). However, as noted elsewhere in this report, only a relatively small percentage of this mortality can be salvaged.

The hardwood mortality has remained basically unchanged.

Resources By Ownership:

An unusual feature of Nova Scotia's forest resource is the high ratio of private to Crown ownership. The province's forest land is distributed among four ownership categories:

Crown - ownership vested in the Province.

Large Private - holdings over 400 ha (1,000 acres) in size.

Small Private - holdings of 400 ha (1,000 acres) or less.

Federal - ownership vested in Canada.

Almost three-quarters of the forest land in the province is privately owned, with fully 52% in holdings of 400 ha (1,000 acres) or less. The large landowners account for another 21%, while the Province owns 24%. Slightly less than 3% is vested in the Federal Crown, primarily in two National Parks.

Figure 8 shows the cover type distribution in each ownership. Each ownership has about the same percentage in each cover type which means that in this respect one ownership category is not significantly different than another.

Because the behaviour of the owner can be a most elusive variable, this ownership pattern is important in calculating future availablity of wood. This feature also warrants careful consideration when the scope and magnitude of future forest management programs are being considered. For these reasons, ownership barriers and other constraints are examined in some detail in Chapter 3.

Nowhere in Canada, except perhaps in P.E.I., does the private sector own 73% of the forest (Figure 9). In New Brunswick the Crown/private ratio is about 45/55, and in other provinces it is as high as 95/5.

FIG. 8

OWNERSHIP AND COVER TYPE

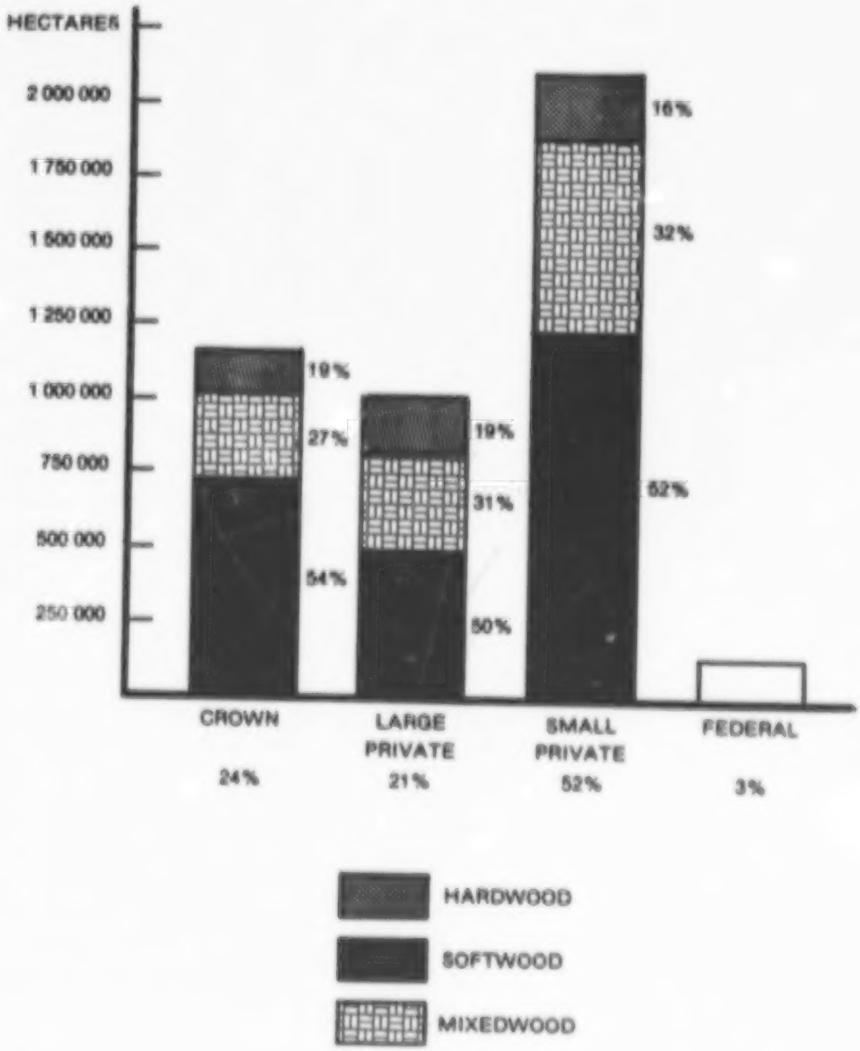
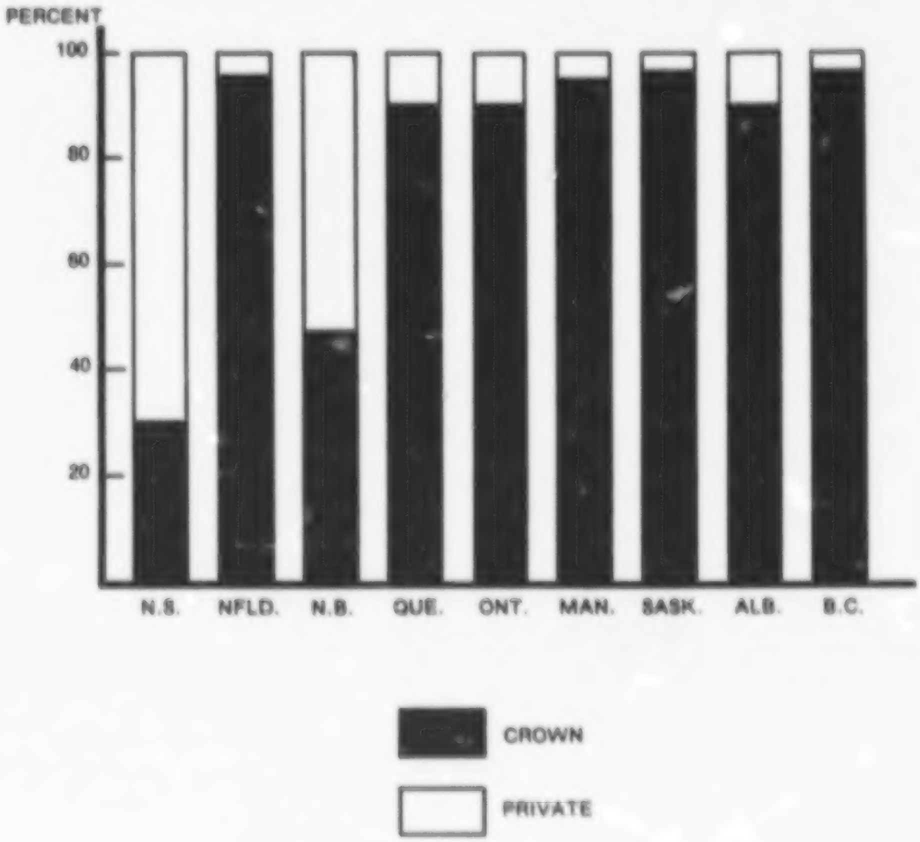


FIG. 9

PERCENT CROWN AND PRIVATE FOREST LAND BY PROVINCE



The age class distribution by ownership (Figure 10) shows that all three ownership classes have the same basic problems as the province as a whole. However, there are slight differences. Thus, the Crown has slightly older forests than the large private, and the small private has somewhat younger forests than either of the other two.

Figure 11 shows the softwood/hardwood components of the forest to be proportional to the ownership percentages. Again, the forest is very similar in composition from ownership to ownership.

FIG. 10

PERCENT AREA AND AGE CLASS DISTRIBUTION BY OWNERSHIP

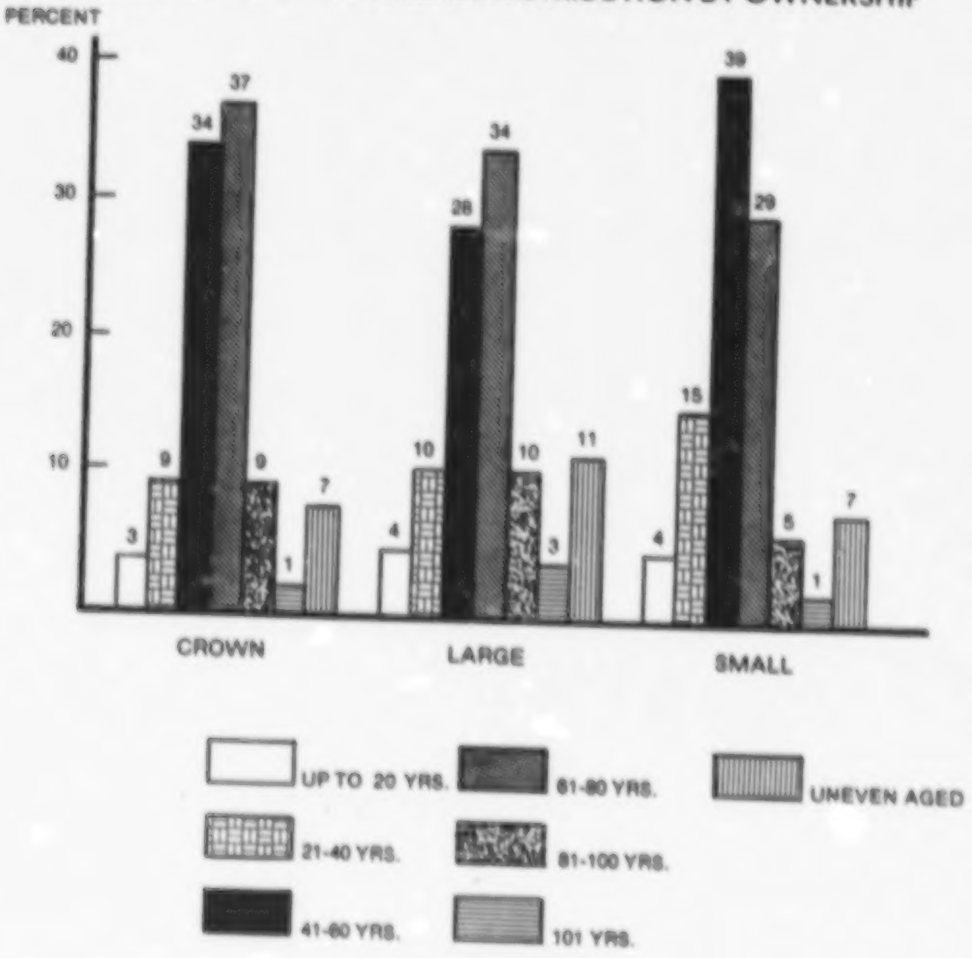
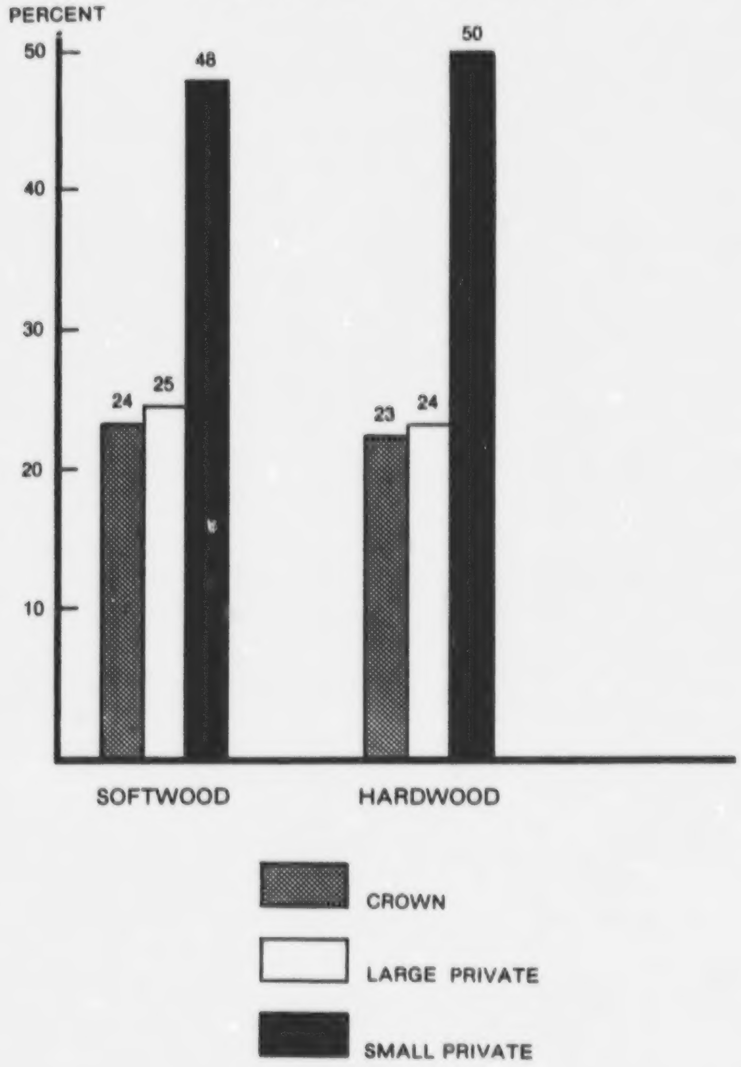


Figure 12 shows what species occur within each ownership. At this level some significant differences appear. Thus 82% of the white spruce is found on small private. This reflects extensive land-clearing and subsequent farm abandonment. In contrast, large private has a higher proportion of red and black spruce, while Crown has a higher proportion of balsam fir, with very little hemlock.

FIG. 11

SPECIES GROUP BY OWNERSHIP



The quality of products available from the growing stock is also important. Figure 13 shows softwood for the sawlog categories. Crown has less than a proportionate share, with large private having the greatest share. The large private has a lower proportion of pulpwood and cull.

FIG. 12

PERCENT SPECIES BY OWNERSHIP

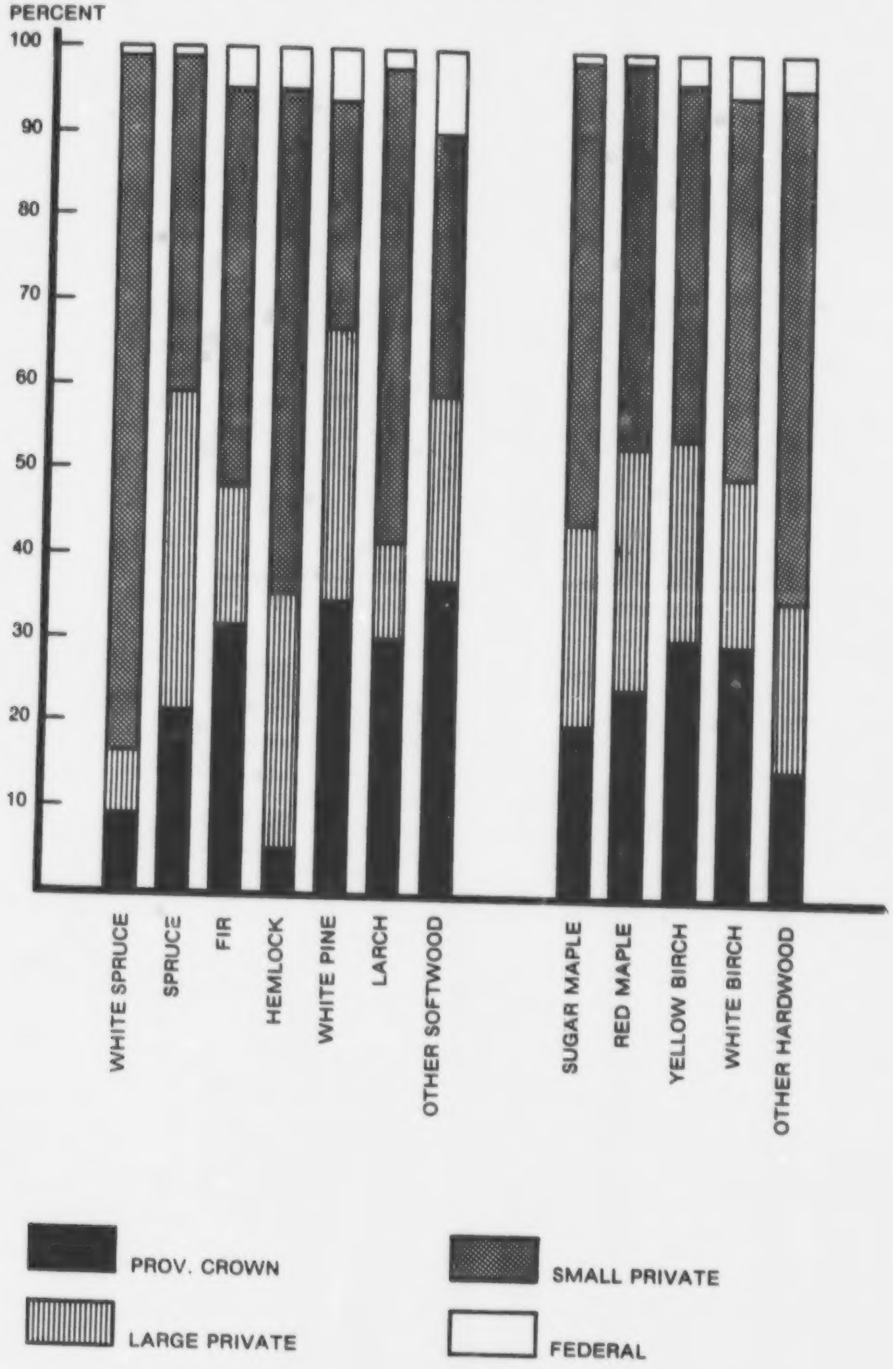
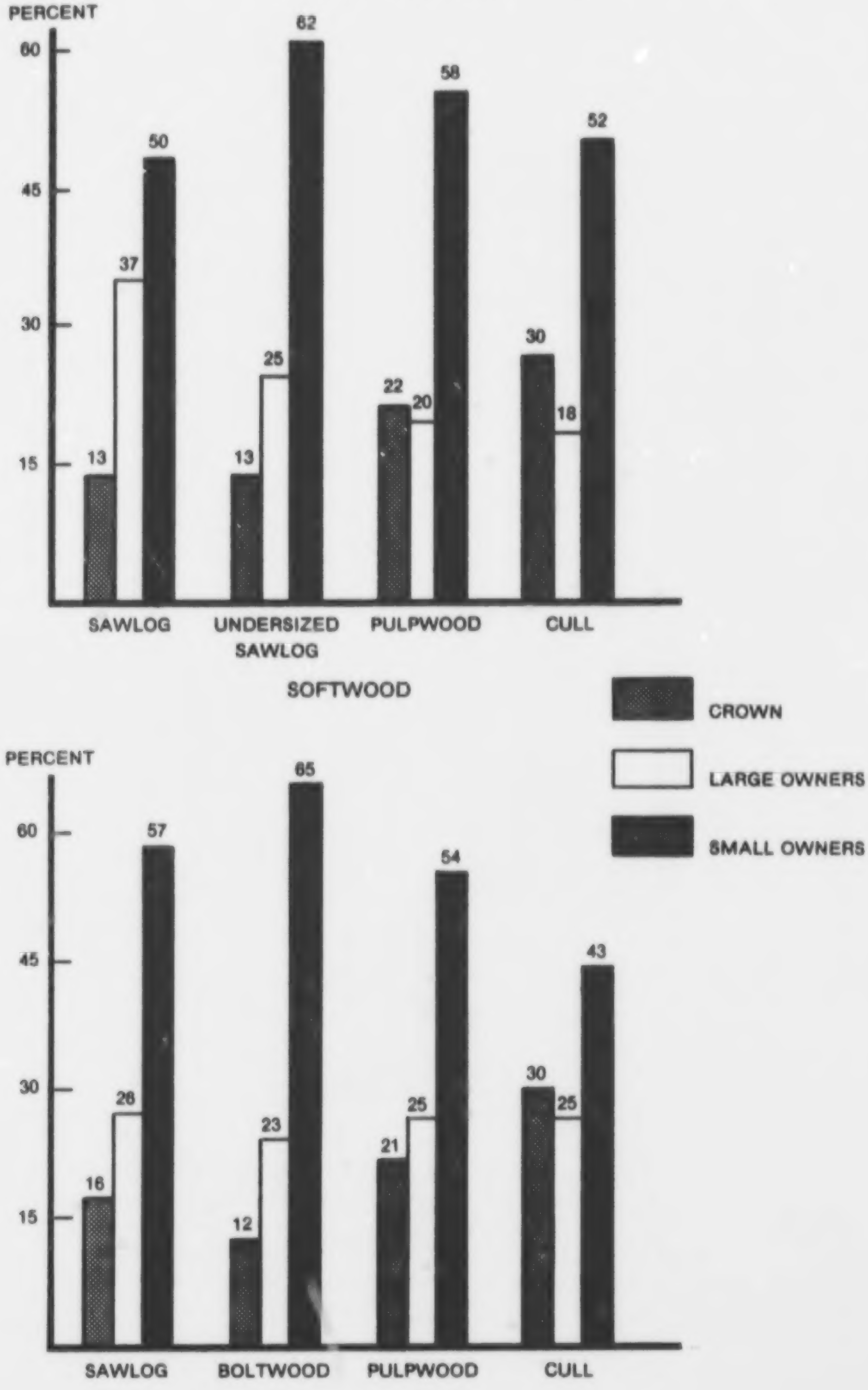


FIG. 13

PRODUCTS BY OWNERSHIP



SOFTWOOD

HARDWOOD

For hardwood (Figure 13) the Crown has a less than proportionate share of sawlog/boltwood, and the small private slightly more. The pulpwood is in proportion and Crown has a higher proportion of cull.

The large private has the highest gross growth, followed closely by small private (Figure 14). The Crown has the lowest gross growth but mortality on Crown is considerably higher. This is mainly due to budworm losses in Cape Breton. The small private has the lowest mortality, in both absolute and relative terms.

Resources by Region:

The next series of figures depict the province on a regional basis. The provincial inventory subdivisions have been grouped into three regions: western (Digby, Yarmouth, Shelburne, Queens, Lunenburg, Kings and Annapolis counties); central (Halifax, Hants, Cumberland, Colchester); and eastern (Pictou, Antigonish, Guysborough and Cape Breton Island).

Figure 15 shows that the ratio of Forest to Non-forest in the three cover types varies somewhat, but that there is no significant difference among the three regions. The western region has a greater proportion of water and non-forest, and less softwood cover, whereas the central and eastern are very similar. The proportion of mixed-wood and hardwood types is very similar in all regions.

The age class distribution by region as shown in Figure 16 is basically the same as for the provincial picture. The western region has slightly younger forests than either of the others, with the eastern having slightly older forests.

FIG. 14

NET GROWTH AND MORTALITY BY OWNERSHIP

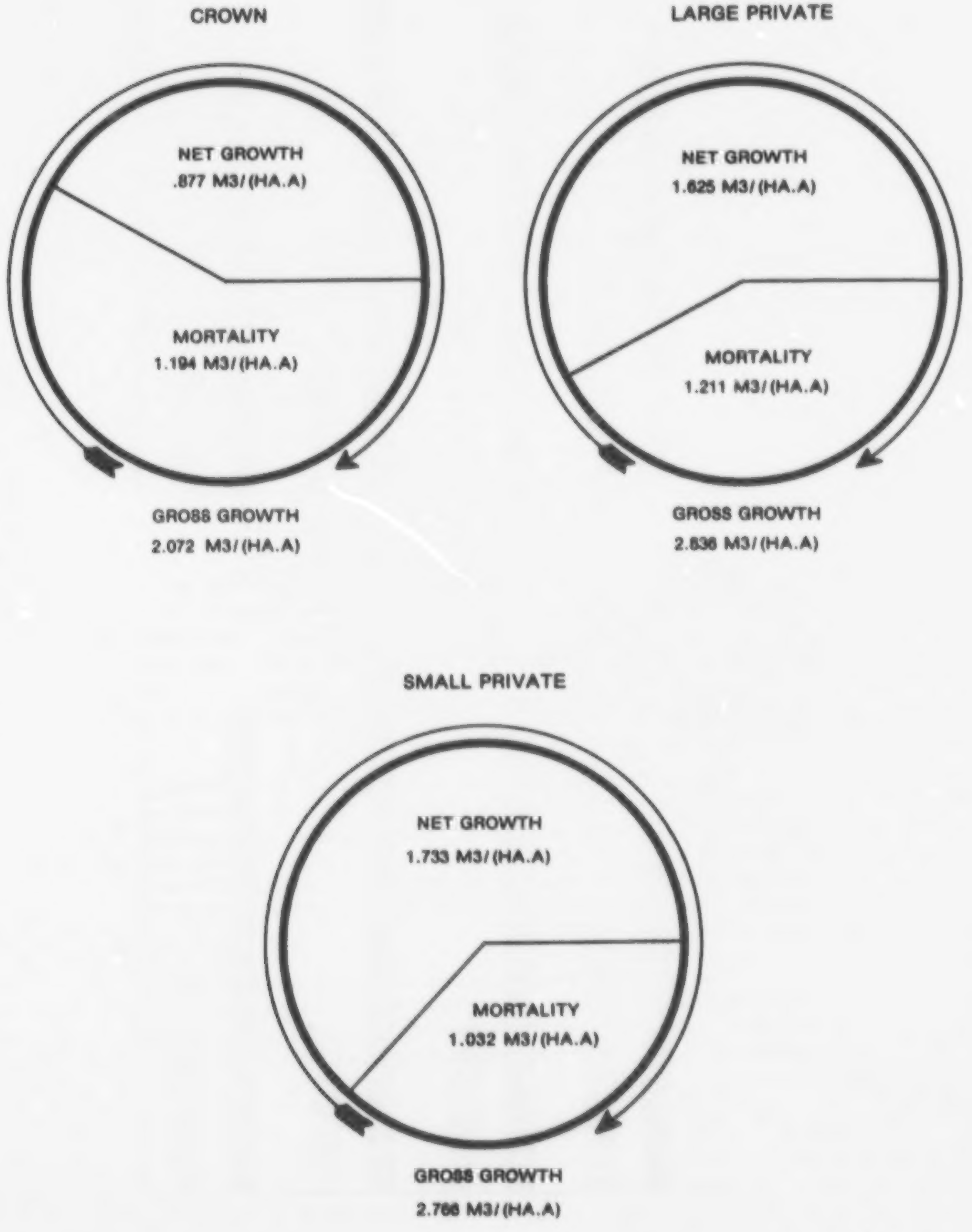
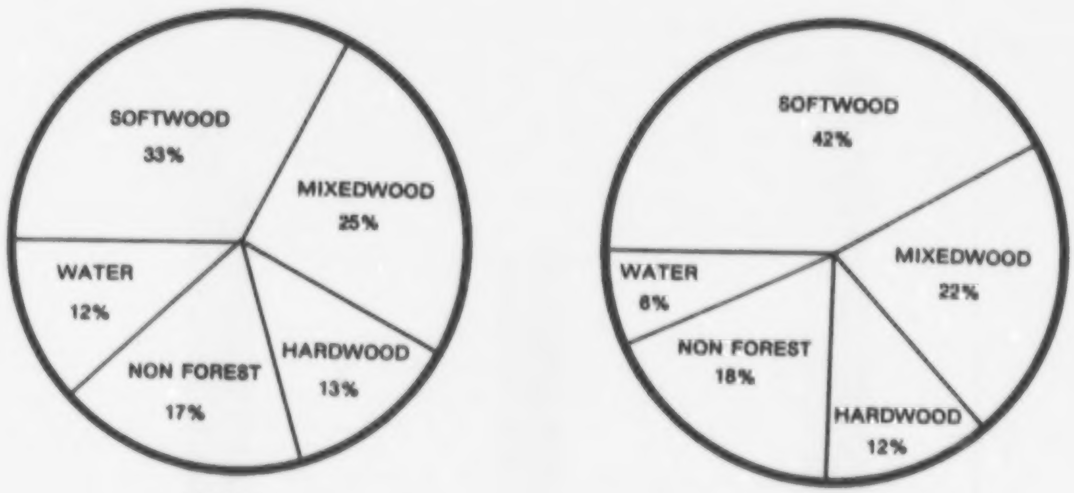


FIG. 15

PERCENT AREA CLASSIFICATION BY REGION

WESTERN

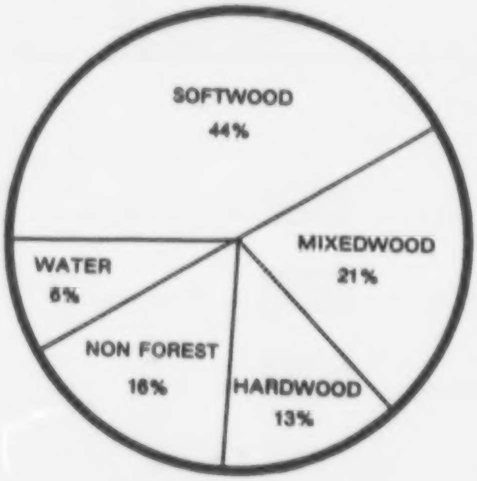
CENTRAL



1 900 000 HA

1 700 000 HA

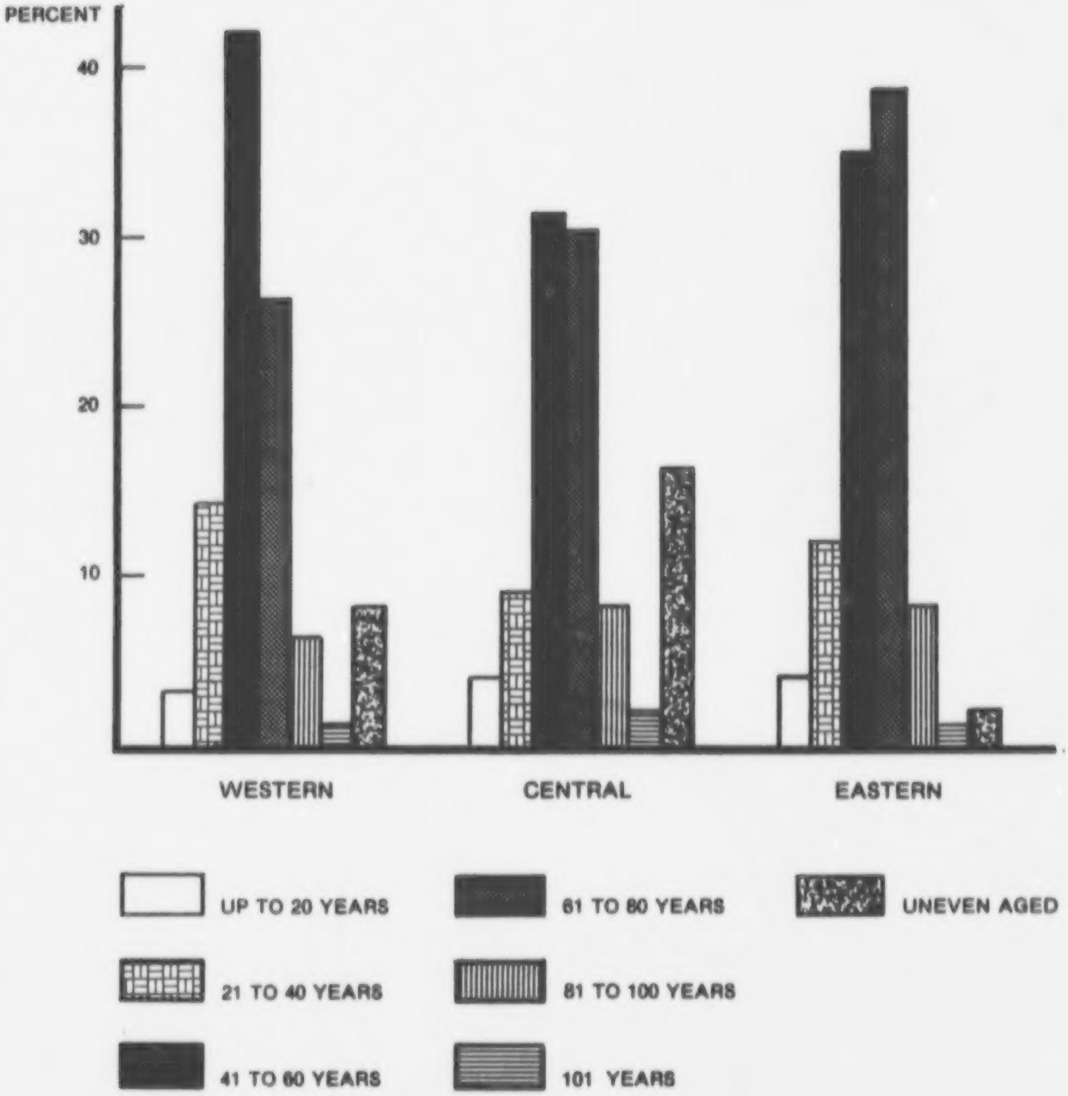
EASTERN



1 900 000 HA

FIG. 16

PERCENT AREA AND AGE CLASS DISTRIBUTION BY REGION



The softwood species distribution (Figure 17) shows that the central and eastern regions have a higher proportion of softwoods than the western region. Fifty-seven percent of the white spruce and 58% of the fir is found in the eastern region. The central region has 50% of the red and black spruce, 30% of the fir and only 20% of the white pine. Only 12% of the fir is found in the western region. Similarily, 47% of the hemlock is in the western region and only 18% grows in the eastern. The western region also has 70% of the white pine.

The western region contains only 11% of sugar maple and yellow birch, but 91% of oak. Red maple and white birch are more evenly distributed, but the eastern region has only 15% of the aspen.

The products are more evenly distributed by region (Figure 18). The eastern region has less softwood sawlog volume and more pulpwood and cull (Figure 19) than the other two. The sawlog component in the eastern region is similar to that in the western region. The eastern region has less boltwood than either the central or western region.

The eastern region has the largest net growth as well as the largest mortality, both in absolute terms and by percentage (Figure 20). The western region has slightly less growth, and considerably less mortality. The high mortality in the eastern region is primarily due to the budworm infestation. The central region has a smaller gross growth but a greater mortality proportionately and in absolute terms than the western region.

FIG. 17

PERCENT SPECIES BY REGION

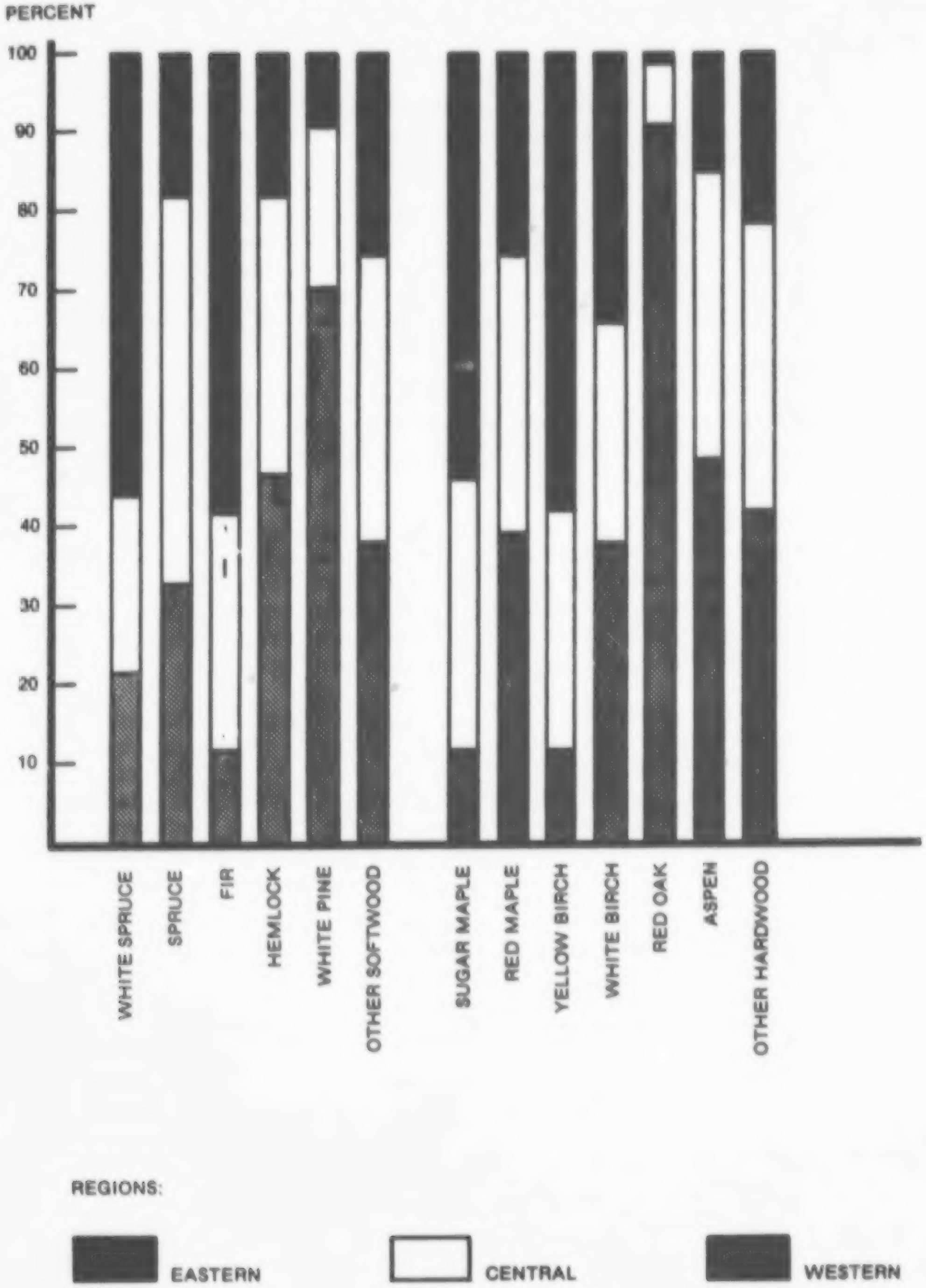


FIG. 18

PERCENT PRODUCTS BY REGION - SOFTWOOD

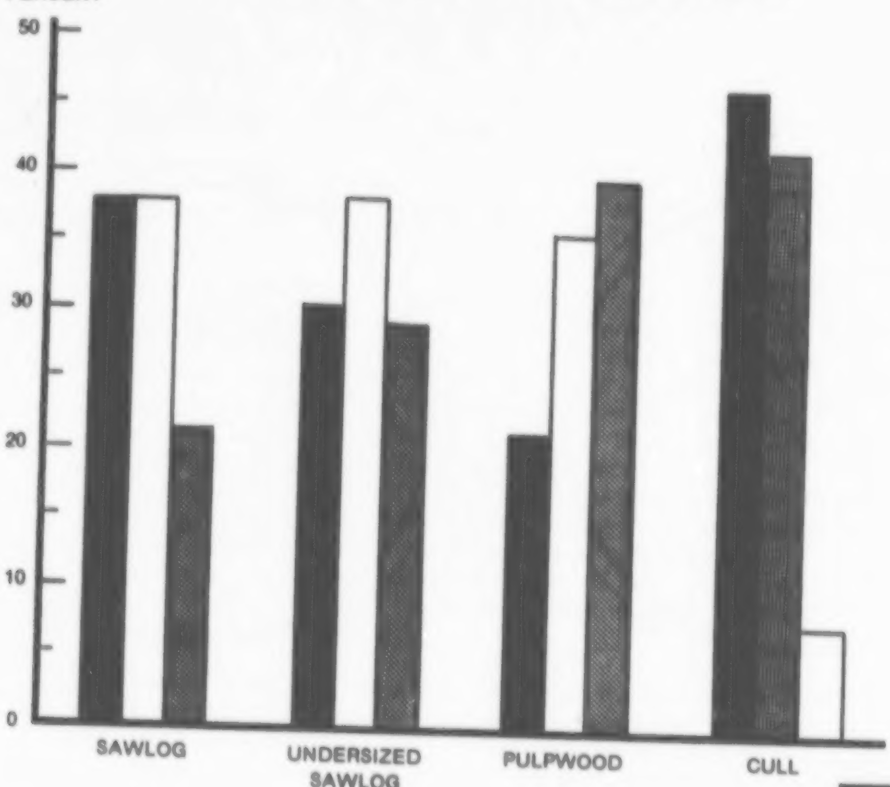


FIG. 19

PERCENT PRODUCTS BY REGION - HARDWOOD

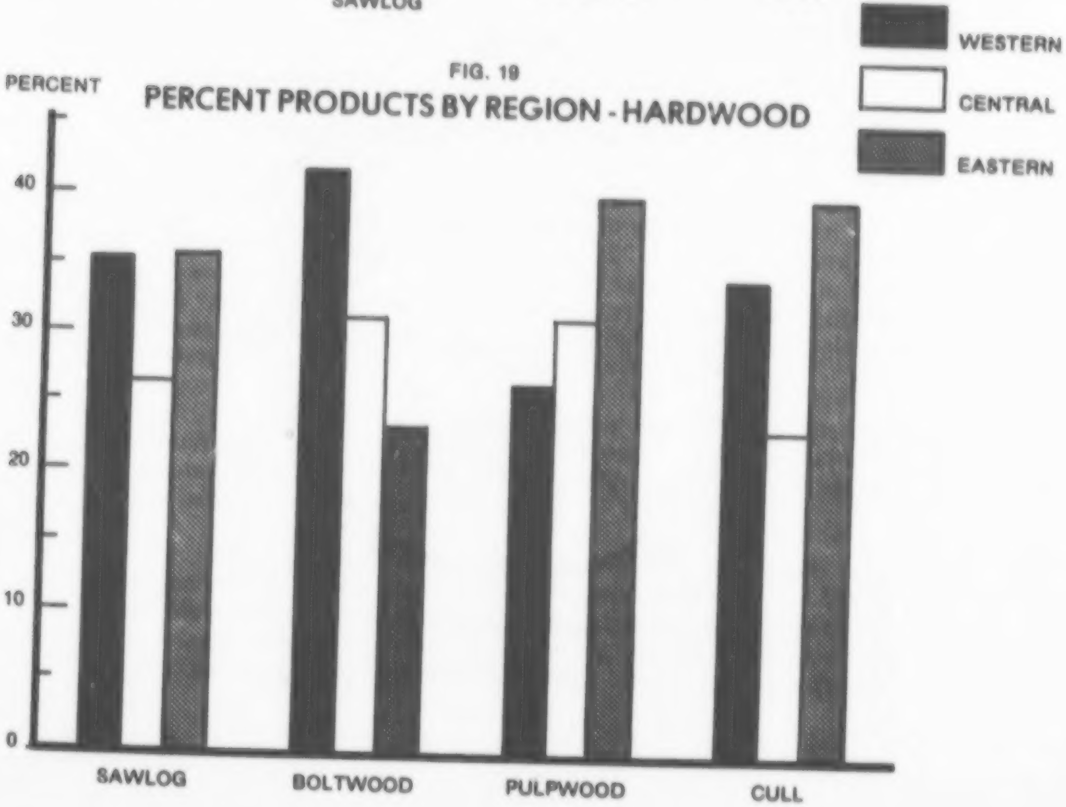
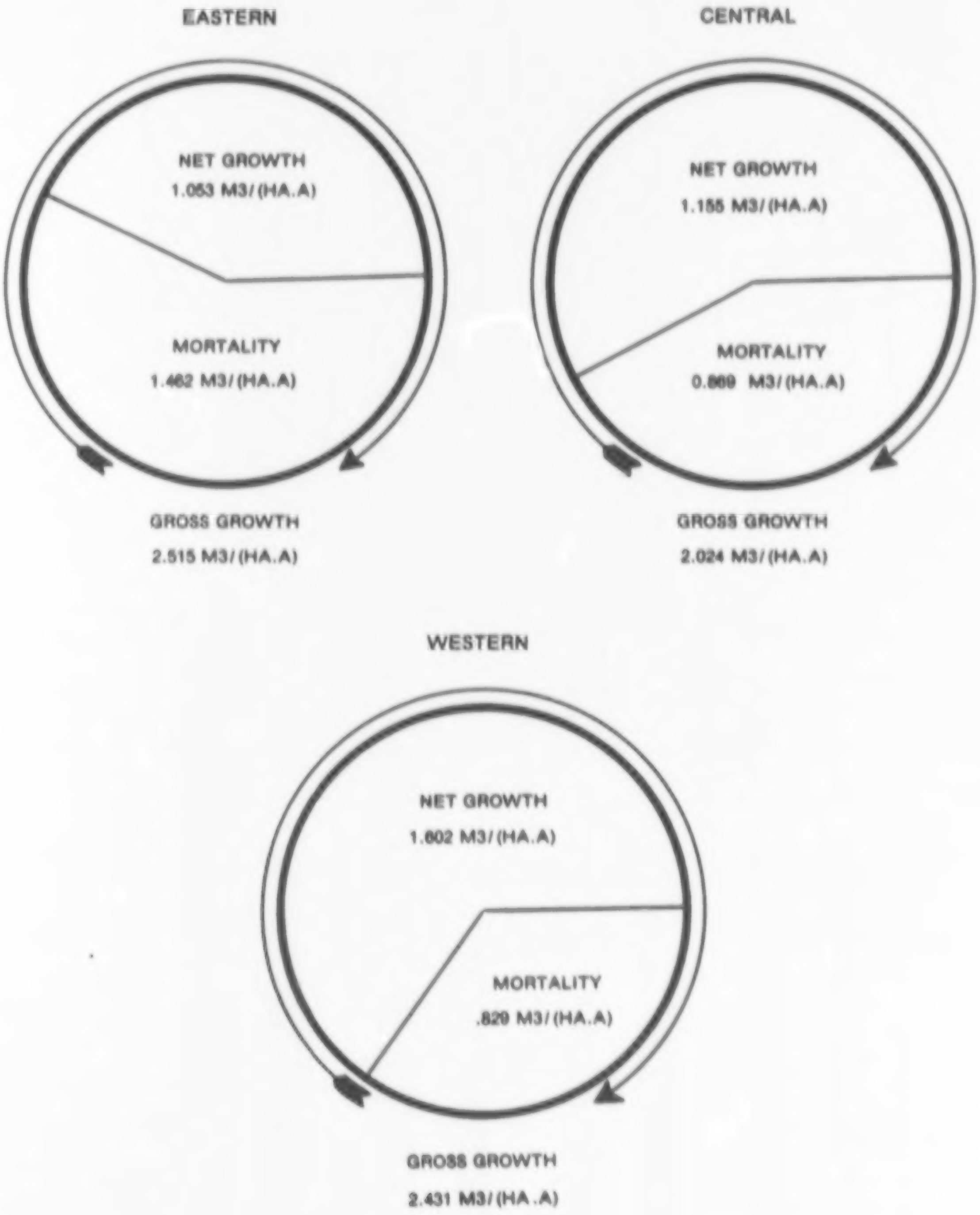


FIG. 20

NET GROWTH AND MORTALITY BY REGION 1965 - 80



Quality, Productivity and Risk

Much of the present forest, especially those stands containing a high proportion of fir and/or white spruce, is prone to insect and disease damage and/or blowdown. Over 70% of the softwood volume in eastern Nova Scotia is made up of only 2 species -- namely balsam fir and white spruce. In Victoria and Inverness counties, balsam fir and white spruce compose almost 90% of the softwood volume. Moreover, most of this fir and white spruce is mature with less than 20% of the softwood forest being under 40 years of age. The vulnerability of the eastern forest has become increasingly evident over the past six years and is underscored by the large losses of softwood fibre caused by the recent budworm epidemic.

While the spruce budworm is the primary concern at present, this insect is not the only enemy of the mature to overmature forest. The taller, older stands are more susceptible to wind damage. This is particularly true of stands located on shallow or imperfectly drained and climatically exposed sites such as those found along the coast and at higher elevations. The windstorms which occured in October 1974, July 1975 and February 1976 caused extensive damage throughout Nova Scotia, especially in Yarmouth, Colchester and Digby counties and throughout Cape Breton Island. Exact figures documenting the volume of wood lost in these storms are not readily available, but incomplete data suggest that the volume lost approximated 1 100 000 m^3 (500,000 cords) of softwood. Many of these areas could not be salvaged in time and have since acted as breeding gardens for bark beetles. These have since spread to adjacent budworm-weakened stands and are now causing widespread mortality.

In addition, there are various insects and diseases which take their toll on mature forests. They include the larch sawfly, the larch bark beetle, the hemlock looper and the white marked tussock moth.

The current mean annual increment of mature softwood stands of the softwood cover type is only 2.1 m^3/ha.a. (0.38 cords/acre/year), while the potential growth rate for managed stands on "average" sites is 8.4 m^3 ha·a (1½ cords/acre/year). This low increment indicates that softwood stands on the average are yielding only 25% of their potential.

Silviculture programs can dramatically increase forest growth rates, which in turn will permit production levels to be increased. The effect, however, is not precisely one-to-one as allowable annual cuts (AAC's) are influenced by the overall forest structure. Most of our forests are already mature and this growing stock must last until new plantations and high yield natural stands can be brought to maturity. Only very limited improvements can be achieved by applying silviculture to already mature stands, many of which are of low quality. Moreover, the costs associated with treating such stands are usually prohibitive.

Summary

This section has presented the state of the resource as it now stands, or, in the case of Cape Breton, as it was prior to the budworm outbreak. The data clearly reveal some of the problem areas: the age class imbalance; the relatively high mortality; large areas of understocked stands and ownership barriers. The data suggest the reason for the budworm problem in Cape Breton, namely an old forest with a very high proportion of susceptible species.

In terms of volume, area, ownership and region, generally speaking the problems are universal, with all ownerships and regions needing the same attention. The exception is Cape Breton, whose problems and forest structure will be changed when the current spruce budworm infestation has run its course and the ultimate extent of the loss is reflected in new data.

Much of the present forest is prone to insect and disease damage and blowdown. The vulnerability of the forests in eastern Nova Scotia in particular has become increasingly evident over the past six years.

Softwood stands are yielding only 25% of their potential indicating the need for increased emphasis on silviculture.

3

Forest Land Ownership & Tenure

3. FOREST LAND OWNERSHIP AND TENURE

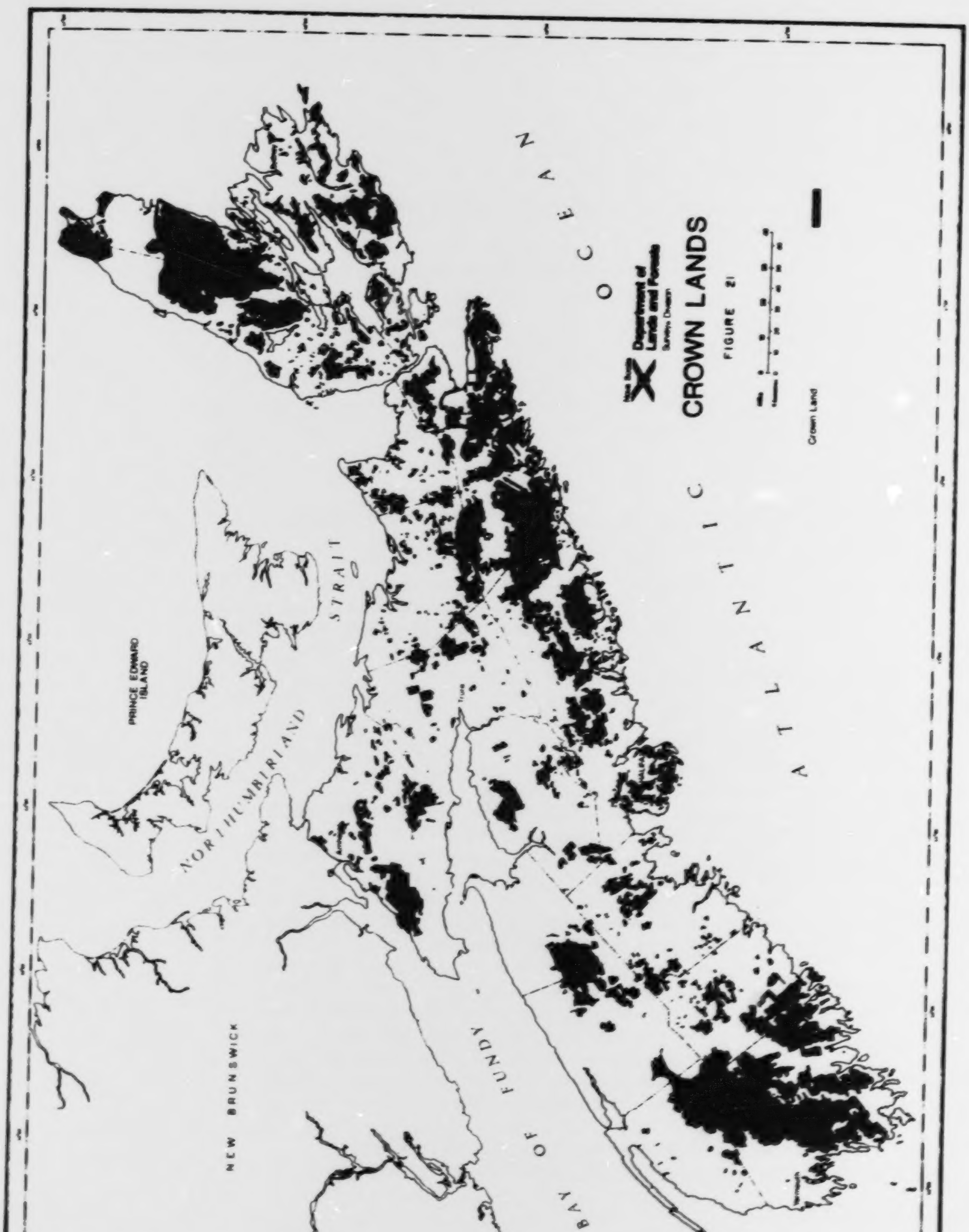
The ownership of forest land was examined briefly in the preceding section. The distribution of the forest resources was also discussed with reference to ownership. In this chapter an attempt is made to describe what use is made of forest lands under the administration and control of the Department of Lands and Forests and the nature of the commitments extant on these lands.

The implications of ownership and the availability of privately owned lands are also examined, as are some of the barriers to forest management inherent in the small private ownership category. A discussion of land acquisition by the Province and the difficulties faced in resolving claims to ungranted lands are also examined. The distribution of Crown land is shown in Figure 21.

Crown Lands

As indicated in Chapter 2, approximately 1 000 000 ha (2.5 million acres) of forest land, or roughly 24% of all forest land in the province, is Crown land under the administration and control of the Department of Lands and Forests. Most of this Crown land is dedicated to forest production and much of it is required to meet various commitments to industry.

Over the years various tenure systems have been used in making Crown land available. The leases of earlier years have now given way to license agreements that provide security of supply while avoiding outright alienation of land. These agreements grant cutting rights to license holders under specified conditions, but the Province retains control over forest management activities.


Nova Scotia
Department of
Lands and Forests
Survey Division
CROWN LANDS
FIGURE 21
Crown Land
ATLANTIC OCEAN
BAY OF FUNDY
NORTHUMBERLAND STRAIT
PRINCE EDWARD ISLAND
NEW BRUNSWICK

At present the following regimes are in use in managing Crown lands:

- Long term license agreements with pulp and paper companies.
- Licence Agreements under Section 79 A of the Lands and Forests Act.
- Direct Management by the Department of Lands and Forests.

License Agreements With Pulp and Paper Companies:

These larger commitments were negotiated in the 1950's and 1960's to encourage industrial expansion, create employment and stimulate new markets for forest products. As of December 31, 1982 the following agreements were in existence under this tenure system.

- The Nova Scotia Pulp Limited Agreement Act

  This license Agreement was originally negotiated in the late 1950's and was a critical factor in the decision by Stora Kopparbergs Bergslags, Aktiebolag, Falun, Sweden to establish a 300 t.p.d. sulphite pulpmill at Point Tupper on the Strait of Canso. The original Agreement took the form of an Act of the House of Assembly, and was assented to on May 3, 1958. The Agreement provided access to virtually all Crown lands in the seven eastern counties and permitted the company to harvest 150,000 cords of softwood pulpwood annually. This represented 60% of the original mill's projected requirements of 250,000 cords annually. The term of the original Agreement was 50 years.

In 1969 this Agreement was renegotiated as part of a decision by the company to expand the pulp mill and construct a newsprint line. This expansion program was designed to permit production in excess of 450 t.p.d. of sulphite pulp and over 400 t.p.d. of newsprint. The annual wood requirements were projected at a minimum of 550,000 cords of which 60% or some 330,000 cords were to be sourced on licensed Crown. The amended Agreement requires the Province to make available to the company a total of some 1,500,000 acres of Crown land in the seven eastern counties by 1986. To date some 1,287,397 acres have been made available. It is anticipated that most of the remaining acreage will be available by 1986. However, the purchase of some 2 000 to 4 000 hectares (5,000 to 10,000) acres may be necessary to meet this commitment.

A silviculture program was also negotiated and included in the amended Agreement in recognition that greater productivity was going to be necessary to satisfy the harvesting requirement. This was to be funded from a silviculture rebate of $1.75 per cord for each cord of healthy softwood pulpwood harvested from the licensed lands. While this may have seemed adequate at the time, it is a small fraction of the total expenditure currently being made by the licensee. Apart from the fact that no provision was made for inflation, the rebate is further devalued by the emphasis on budworm salvage wood in recent years. The budworm killed wood is made available at a greatly reduced stumpage rate ($0.50 per cord). Funding for the silviculture program is now borne by the company with incentive assistance under federal/provincial agreements.

The term was also changed when the Agreement was renegotiated. The revised term is

50 years from the start-up of the newsprint line (July 22, 1971). In addition, an "evergreen" clause was added to provide for extensions of a further 10 years after each 10 year period has elapsed, providing the company has complied with all terms and conditions of the Agreement.

The operation of the pulp and newsprint mill and the management of the license agreement is now conducted under the name and style of Nova Scotia Forest Industries (NSFI) under agreement with Nova Scotia Pulp Limited. NSFI is an operating division of Stora Kopparbergs Berglags, Aktiebolag, Falun, Sweden.

- The Scott Maritimes Pulp Limited Agreement Act

This Agreement was negotiated in the early 1960's as an inducement to the company to establish a bleached kraft pulp mill at Abercrombie Point, Pictou County with a capacity in excess of 500 t.p.d. This Agreement is in the form of an Act of the Legislative Assembly assented to on March 30, 1965. The Agreement provides access to most of the productive Crown land in eastern Halifax County. While the statute commits the Province to make available to the company approximately 230 thousand acres of productive Crown lands, some of the lands originally placed at the disposal of the company have since been surrendered to the Province. The License Agreement now covers approximately 210,000 acres. The Agreement permits the Company to harvest 50,000 cords of "wood of all kinds", representing approximately 12% of the average annual requirements of the mill.

While not provided for in the Agreement, a silviculture rebate arrangement has been in effect since 1978. This arrangement provides for the funding of silviculture costs on the licensed lands up to 65% of the stumpage paid annually.

The term of the Agreement is for an initial 50 years with an option to renew for a further period of 40 years.

The name of the Company has since been changed to Scott Maritimes Limited.

Agreements Under Section 79 A:

In 1974 the Lands and Forests Act was amended to permit the Minister to enter into agreements with wood product companies for the supply of wood from Crown land. Since that time a number of agreements have been negotiated under this section. With one exception these agreements have been with sawmills for the supply of sawlogs. The one exception is an agreement with Masonite Canada Ltd. for the supply of wood for the hardboard plant at East River, Lunenburg County.

Several of the Agreements negotiated under the section of the Act result from "buy back" arrangements whereby the Province has agreed to enter into a license agreement with a former owner after the lands have been acquired by the Crown.

The Act stipulates that Agreements under the section shall be for a maximum of 10 years with an option to renew for a further 10 years.

These agreements specify the maximum volumes that can be harvested by the licensee. They are in the nature of wood supply commitments and do not necessarily specify the area of Crown land involved. The Department of Lands and Forests selects the area to be harvested. Harvesting and road construction are then the responsibility of the license holder. The Department is responsible for subsequent management, including silviculture.

Direct Management by the Department:

The third tenure system in use involves direct management by the Department of Lands and Forests. The Department arranges for all management operations. When harvesting is required, the merchantable wood is sold by tender, either as standing timber or at roadside after harvesting by the Department. Cutting permits for fuelwood are also issued.

The Role of Crown Lands in Forest Industry Development

While comprising less than one-quarter of the productive forest land in the province, Crown lands have been a significant factor in the development of the forest industries that the province now enjoys.

The Nova Scotia Pulp Limited Agreement Act resulted in the establishment of a major industry that now provides employment for over 2,000 Nova Scotians directly and many thousands more indirectly. The Scott Maritimes Ltd. mill provides over 1,000 direct jobs with a commensurate indirect effect. The ability of the Province to provide assurance of part of the wood requirements from Crown lands was a critical ingredient in the decisions that led to the location of these plants in Nova Scotia.

The market created for privately produced wood in the province has been equally important. The two mills mentioned above require a total of 2 200 000 m^3 (1 million cords) of wood annually. Of this total, less than 40% (839 000 m^3 or 380,000 cords) is guaranteed from Crown land. The remainder of this requirement must be sourced on private land, much of it from the small private holdings. This is a very significant market for private wood that in all likelihood would not have existed if the Province had not been in a position to guarantee part of the wood requirements of these mills.

The ability of the Province to grant license agreements under Section 79A of the Lands and Forests Act has also been instrumental in having the hardboard mill at East River, Lunenburg County established and maintained. This plant requires up to 220 000 m^3 (100,000 cords) annually. The Province has made a commitment for up to 25% of this volume from Crown lands. The remaining wood requirements must be sourced on private land creating another significant market for private landowners. The Masonite mill provides approximately 600 jobs when operating at capacity. Again, it is reasonable to suggest that this plant would not be operating where it is without a guarantee of wood from Crown land.

The effect on a number of sawmills has also been positive. In keeping with the provisions of Section 79A the Province has been able to provide support to several mills, thus helping to retain productive capacity, sawlog markets for private lands, jobs and incomes for the province. At present, 10 sawmills have access to sawlogs from Crown lands by virtue of license agreements. These commitments account for approximately 5% of the total sawlog requirements of industry. An additional 5 to 6% is accounted for through tender sales and sawlogs harvested under pulp and paper license agreements.

In the longer term agreements the stumpage fees negotiated were an important consideration in having these companies locate in Nova Scotia. The more recent agreements also have a base stumpage rate, established in relation to going market prices at the time the agreement is negotiated. In all cases, an adjusting formula based on end product prices is included in the agreement.

Overall, the allocation of the Crown land harvest has been very significant in terms of industrial development, employment and ancillary benefits as well as in terms of improved forest management on all ownerships.

Existing commitments on Crown land will require much of the harvest from the larger blocks in future. As access is improved and silviculture treatments are accelerated it may be possible to increase the harvest in central and western regions. However, no large unallocated timber supply exists and the Province may be hard pressed to meet existing commitments in eastern Nova Scotia in particular.

The Acquisition of Land by the Province

In 1937 the Province adopted a policy of conserving timber resources of the publicly owned lands and about the same time began to purchase cutover lands, abandoned farmlands and properties sold by municipal tax sale at prices not to exceed $1.00 per acre. At that time it was estimated that there were approximately 951 000 ha (2,350,000 acres) of ungranted Crown land remaining in the Province; including up to 121 000 ha (300,000 acres) where the Crown's title may have been extinguished through possessory claims established through long use and occupation. These claims were for the most part located on Cape Breton Island, and even today they continue to be a major problem in the management of Crown lands.

Over the past 45 years the Province has acquired in excess of 450 000 ha (1 million acres). This activity has proven beneficial to the Province in a number of ways:

- it has permitted the consolidation of fragmented blocks of Crown lands into larger units where intensive management is feasible;
- larger blocks of Crown land have been an important development tool - the establishment of two pulpmills and a hardboard mill have been attributable to the ability of the Province to grant access to extensive blocks of Crown land;
- this expansion of the forest industry has been important in terms of employment and income

for the Province and has provided a much needed market for the output from private forest land.

The land acquisitiion policy has been sound; the inevitable conclusion being that the purchase of forest reserves represents a suitable, if not necessary, deployment of public funds. The capital gain on these lands alone has been in the tens of millions of dollars.

When viewed in the light of present day conditions, it would appear that a continued expansion of Crown holdings is still justified. Among the conditions that contribute to this conclusion are the following:

- the extent of forest land vested in the name of the Crown is still relatively small (less than 25%);
- indications are that a significant percentage of privately owned forest land has been withdrawn from the production of fibre for industry because of changes in tenure and pressures from recreational and speculative interests;
- increasing alienation of forest land could cause a decrease in forest based industries;
- expanded Crown holdings are needed to meet existing commitments and to assure a portion of the requirements of industry;
- a Crown land acquisition policy, coupled with incentives to private owners to practice long term management, are essential components of an ongoing forest development strategy.

The Crown now owns about 25% of the land in the Province. With the exception of Prince Edward Island, this is considerably less than in the other provinces in Canada. In fact, all provinces except those comprising the Maritimes own over 80% of their productive forests.

Under the Nova Scotia Pulp Limited Agreement Act, the Province is committed to turn over to the Company a total of 1.5 million acres of Crown land by July 21, 1986. To date, 1,287,397 acres have been turned over and placed under management of the Company. Subject to investigation of claims to ungranted lands, the latest figures available indicate that we are several thousand acres short of our objective. If we are to meet that objective an attempt should be made to acquire these additional lands as soon as possible.

The Province has been acquiring land for over 40 years. As indicated above, the early purchases were mainly for poorer quality cut-over lands and prices were correspondingly low. In recent years better quality stands have been acquired and the cost of acquiring land has been rising sharply. However, the money for land purchase has been spent wisely; the average cost for forest land is still in the range of $75.00 to $100.00 per acre depending upon the volume of forest products growing on the land.

The basic philosophy behind the forest reserve land purchase policy has remained intact since the Province started to purchase forest land in support of a viable forest industry. While the policy has been reviewed by successive administrations, it has not changed. The Department purchases only forest reserve:

- that consolidates Crown holdings;
- that is considered to be a good investment and one which will act as a nucleus to form blocks of forest land into viable economic land management units.

In addition to lands for forest reserve, the Department of Lands and Forests purchases land for provincial parks and other recreational purposes and for other Government departments and agencies.

Ungranted Land Subject to Claim

The Minister of Lands and Forests has under his supervision, direction and control the management, lease, sale or other disposition of Crown lands. Over the years the Minister of Lands and Forests, and the Commissioner of Crown lands before him, have been responsible for the granting of Crown land throughout the Province. Approximately 951 000 ha (2,350,000 acres) of land in Nova Scotia has not been granted and this constitutes the greater part of the Crown land in the Province.

It is estimated that there are in excess of 66 000 ha (163,000 acres) of ungranted land in Cape Breton that may be subject to possessory claims. There are small acreages, amounting to at least 35 000 ha (87,000 acres), throughout mainland Nova Scotia that may be also subject to claim.

Cape Breton Island:

The situation developed uniquely in Cape Breton when early decisions were made not to grant lands. After the Treaty of Paris in 1763, the British Lords of Trade instructed the Governor to make free grants of land in Nova Scotia, but not in Cape Breton. On Cape Breton only "licences of occupation" were granted. In these cases, the property would revert to the Crown on the death of the licencee.

When Cape Breton was separated from Nova Scotia in 1784, the situation changed and the Lieutenant Governor began issuing Crown grants. There was a great influx of people into Cape Breton during the first half of the 19th century and with it grew an urgency to survey and clarify titles to occupied land. An Act to Facilitate the Perfecting of Titles in the Island of Cape Breton, called the Squatters Act, was passed in 1869. Commissioners were appointed to hear cases and report to the Governor-in-Council. Once their reports were approved, boundary surveys were to be done, the claims confirmed and grants issued.

Many squatters who petitioned for grants under the Squatters Act did not press their claims to the point where they actually received grants. Until the early 1960's the Government of Nova Scotia issued confirmatory grants on these lands to confirm titles and the title to many properties were resolved at that time. Around the year 1960, the Government ceased issuing confirmatory grants.

In 1963 the Department of Lands and Forests began to issue "Certificates of Non-Interest" (Section 29(A), now Section 30(1) of the Lands and Forests Act), on these lands. As of January 31, 1983, 515 such releases have been issued covering approximately 38 000 ha (93,000 acres) of land.

These certificates do not vest title in the name of any person or persons in the land. They simply release whatever interest, if any, the Crown may have in the land and answer the essential qustion: is the land Crown land, or is it held by the private sector?.

In 1973 the Government added Section 11A to the Lands and Forests Act to simplify the problems of land claimants. Under this Section, a commissioner was appointed to rule on the legal status of ungranted land after considering the arguments of the Crown and the claimant. This procedure was used by about a dozen claimants. The Commissioner's powers were challenged in the Nova Scotia Court of Appeal which found the Legislation to be ultra vires the Province of Nova Scotia. Only the Courts can could determine title to such lands.

Mainland Nova Scotia:

The situation on mainland Nova Scotia is somewhat different. Large "townships" were granted. Outside the township grants individual grants were given.

After the American Revolution, large tracts of land, particularly in Shelburne County, were "located" to the United Empire Loyalists. Crown grants cannot be found on several of these parcels of land. It appears that all the preliminary steps were taken to issue these grants, but the actual document, the Crown grant or copies of it, cannot in many cases be found today. To confirm this point, Section 30 releases have been issued on several of these large blocks of land. These releases exclude lands which have been bought, expropriated, leased or otherwise acquired by the Crown.

The Law:

The Limitation of Actions Act requires that there be 60 years of adverse possession before the Crown's interest in land is extinguished. Common law has defined adverse possession as possession which is continuous, exclusive, adverse and actual.

Problems Related to Ungranted Land:

Uninvestigated, ungranted land is technically Crown land unless the Crown's interest has been extinguished by adverse possession. From a practical point of view, however, it is land of uncertain ownership and, as such, cannot be utilized to its full resource potential. This creates significant problems for the Crown and claimants.

- Problems encountered by the Crown:

  The Province, through the Department of Lands and Forests, is responsible for distinguishing between Crown land and private land. This is necessary to enable the Crown to manage its lands and fulfill commitments made with regard to Crown land.

  Secondly, one of the Department of Lands and Forests' functions is to manage forest land owned by the Province and to promote management of privately owned forest land. This helps maintain employment and incomes, satisfies wildlife and recreational demands and generally encourages the social and economic development of the Province. Forest lands of unknown status cannot fall under either a

Crown Land Forest Management Program or a Private Land Forest Management Program until its status as either Crown land or private land is established.

- Problems encountered by claimants:

Individuals or companies seeking to sell land find some lawyers will not certify title to ungranted land until the Crown's interest has been clarified. As well, mortgage funds and grants to improve existing homes may be difficult to obtain. Often land sales are lost or delayed.

Some claimants not placed in one of these crisis situations are nevertheless frustrated by the length of time it often takes to process claims (anywhere from six months to two years). This problem has been partially rectified by an internal streamlining of departmental procedures, and efforts continue to be made towards this end. To a large degree, however, delays are the inevitable result of demands exceeding resources. The Department simply does not have the manpower to handle the yearly volume of claims as quickly as desired.

Municipalities also encounter difficulties. Each year municipalities post ungranted lands for tax sale. These sales are often delayed until the Crown's interest in the land is determined.

A problem faced by the Crown and claimant alike is the disappearance of physical evidence of past land use; the damage caused by the spruce budworm has only accelerated this natural process. Equally as inevitable, every year a few elderly residents of our communities die, and with them goes irreplaceable first-hand knowledge of past use made of ungranted land. Clearly, time is of the essence in determining the status of these lands.

Departmental Procedure for Processing Claims:

The Governor-in-Council is required under Section 30 to review and authorize any relase of the Crown's interest in ungranted land. Several stages of activity must be completed before it is possible for such authorization to be given:

- Stage 1 - Initial Contact by Claimant

  Normally the claims process begins when a claimant or his solicitor approaches the Department requesting a Section 30 Certificate. Staff then verifies the ungranted status of the land by investigating all documentation, including plans, maps and correspondence at the Department's Crown Lands Registry and Research Section, Halifax.

- Stage 2 - Field Investigation

  Assuming this research confirms the land is ungranted, the Department's field staff conducts an investigation to determine the nature of the use and/or occupation made of the lot in question.

  The Department has assigned field staff in the four counties of Cape Breton and the County of Guysborough to investigate land claims. In the remaining counties, staff are assigned to investigate claims as the need arises. "Crisis" claims, for example those where land sales are delayed, are dealt with immediatly. Claimants who express a desire to manage woodlands under the Private Land Forest Management Program are also given priority. As a matter of policy, however, staff investigates large areas of land in an effort to issue releases in a block, rather than individually. This may necessitate investigating a lot even though no claimant has yet come forward requesting a release.

The field investigation includes: determining from evidence on the ground the extent and time span of use and/or occupation; the gathering of a Statutory Declaration, usually from an elderly resident of the community; the compilation of an Abstract of Title and the preparation of a detailed field plan. Often staff are supplied the Abstract of Title and Statutory Declaration by the claimant, and this is encouraged. The information gathered from this investigation forms the substance of the Department's field report.

- Stage 3 - Review and Recommendation Stage

When a field report is submitted, the file is reviewed by the Department's Committee on Claims to Ungranted Lands, which is comprised of the Subdivision Manager, District Supervisor, the member of staff who prepared the report, the District Surveyor and the Department's Solicitor. If, after reviewing the report, the Committee determines the elements required to show adverse possession against the Crown do not exist, the claimant is notified the lot is considered Crown. The claimant may accept this decision, submit further information to substantiate his claim or, as a last resort, take the matter to court.

If the Committee recommends the release of the Crown's interest, a plan and description of the lot are prepared. Once completed, the matter is submitted to Cabinet for its approval. The claimant is then notified of Cabinet's decision.

Privately Owned Land

As indicated in Chapter 2, almost three-quarters of the forest land in Nova Scotia is privately owned. Lands in the small private category (less than 1,000 acres or 400 ha) account for 52% of the productive forest land. The remainder is in the large private ownership category (more than 1,000 acres or 400 ha), representing 21% of the forest land in the province.

The Availability of Private Land

From a forest management point of view, who owns the land is less important than whether or not the owners are managing their land for the production of forest products or interested in doing so. This has been termed the "availability" of the resource. In other words, in a given time period, is the growing stock on a parcel of land potentially available as a source of supply for industrial requirements?

Many of the large private owners are associated in some way with the forest products industry. Accordingly, it is reasonable to assume that much of the productive forest land in this category is presently available for forest management and will probably continue to be available for the foreseeable future. This assumption is reinforced by the predominance of ownerships tied directly to pulp, paper and sawmilling firms, and especially the percentage of the total owned by two pulp and paper companies in the province. While there is no fundamental reason why these lands could not be dedicated to other uses, through sale or otherwise, there is no basis for suggesting that any significant proportion of these lands will be alienated from forestry in the foreseeable future.

The situation with respect to the small private ownerships is much more complex. As indicated above, there are approximately 2 100 000 ha (5.2 million acres) of forest land in this category. This is divided into some 50,000 parcels owned by over 30,000 individuals, partnerships or corporations.

A survey of these woodlot owners was recently conducted under the Subsidiary Agreement for Forestry, and provides the basis for a reasonably accurate estimate of availability. The owners of 73% of forest land in the sample indicated that they had carried out some type of activity on the property in the last 5 years. Owners of 47% of land has actually sold products in the last two years. 46% of the owners indicated they had cut fuelwood. Most owners indicated that they hope to be more active in forest management in the future. 75% of the owners (owning 84% of the land) expect to perform work on their property.

Whether or not an owner will follow through with his or her intentions will depend upon personal circumstances, wood prices, availability of markets, government incentive programs, and attitudes toward forestry activities in a given period of time. In earlier wood supply studies the overall availability of the small private resource was estimated as 50%. Given the optimism indicated in the recent survey, it would seem that this estimate could now be raised to 60% or even higher, provided incentive programs are continued.

The survey did not indicate the extent of foreign ownership but provided information on how far the owners lived from their properties. For those who lived more than 320 km (200 miles) from their holdings 81% had done nothing on their property in the past 5 years. Only 33% of those living closer than 320 km (200 miles) had done nothing in the same period.

The potential availability of privately owned forest land is a significant variable in estimating the sustainable harvest (AAC) for the province. The survey provides the basis for a reasonably reliable estimate of the percentage of land in the small private ownership category that is expected to contribute to the forest harvest over the next rotation.

Based on the survey results, the estimated level of nonparticipation could be set at around 40% representing approximately 810 000 ha (2 million acres) of productive forest land. Responses to questions concerning price, uncertainties over what is required and a veritable host of difficulties imposed by age, infirmity, distance from residence to property as well as attitudes toward the forest industry and ownership of land are difficult to interpret. Nevertheless, attitudes and incompatible uses must be regarded as a reality which will reduce the potential harvest from this category of tenure.

Privately owned lands are obviously critical to the future viability of the forest product industries of Nova Scotia. If this analysis is reasonably accurate, the productive forest land in the small private category that is expected to be available for forest management and production should be set at around 1 300 000 ha (3.2 million acres). As indicated below, this is the approach taken with private lands in estimating the future availability of wood.

Boundary Line Problems:

Practical utilization of the forested land in Nova Scotia depends on landowners knowing the extent of their holdings and the quality of title associated with each parcel they own. Defining both the extent and quality of the title for Nova Scotia landowners is a 200- to 300-year old problem that, in some areas continues to worsen with each succeeding year. This is especially true for forested land. One of the major problems facing Nova Scotia woodlot owners is how to accurately identify their property boundaries on the ground. Generations of neglect of proper boundaries have put the present owners in a position of not knowing the bounds of their land. In a good many cases, land owners have only a general idea of where their land is located.

Several major factors contribute to this problem of poor property line definition:

- poor early surveys that left the boundary lines in a state of confusion;
- lack of interest or resources on the part of the owners to maintain their boundary lines;
- the Nova Scotia registry system;
- the value of the land;
- the cost of surveys.

Most of the land grants in Nova Scotia were surveyed as individual lots. Often 50 to 100 years would elapse before the adjoining grants were surveyed, and unintentional overlaps and gaps regularly occured. Due mainly to the isolated location of the property and the low value of the land very few such cases were ever resolved.

As the rural lands were passed from one generation to another, much of the respect for the land and the value of maintaining property lines began to slip away. Land owners began leaving the rural areas, forest fires took their toll, and people, for whatever reason, just didn't maintain their boundaries. By the early 1900's, not only had the original corners started disappearing but much of the secondary boundary line evidence was becoming hard to find. Today, on many of these rural boundary lines, no evidence remains whatsoever.

The registry of deeds system has been in existence since the first grant was issued in 1731. The system does not require the registration of deeds for land conveyancing nor does it require boundary surveys be carried out prior to land transfer. In various areas of the province, forested land can still be subdivided and conveyed without the benefit of a survey, a certification of title or the registration of the deed. This weak system of registration is one of the main reasons why the land tenure situation in Nova Scotia is in such terrible shape today.

The value of forested land in Nova Scotia has always been relatively low. Its assessed value depended on the amount or quality of timber on the lot at any particular time. Most private woodlots in the province were used as a source of supply for domestic fuelwood, with some occasional commercial cutting. Within the last 50 years, the sale of pulpwood and sawlogs has increased significantly. But the value of the land was still closely related to the amount and quality of timber on the lot. The landowners rarely did much with the land beyond occasional cutting, which is probably why so few of them invested in an up-to-date boundary survey.

Because of the low value of forested land and the fact that many woodlot boundaries are difficult to re-establish, there is often little relationship between the value of the land and the cost of the survey. A valuable property may be easy to survey while another of less value could very well have many problems associated with it. A typical rural woodlot in Nova Scotia is one which was first surveyed for a grant some 150-200 years ago and has only had periodic boundary line maintenance since the early survey. In most cases, the original corner markers and line blazes have long since disappeared and the boundaries of the adjoining lots must first be re-established before the subject lot can be resurveyed. Often the surveyor finds more than one set of blazes for a line, or finds that the blazes or fence lines are in conflict with the location of the boundary as called for in the deed description. In some cases there are no deeds whatsoever.

In defining the duty of the land surveyor, Thomas M. Cooley, Chief Justice, Supreme Court of Michigan, in his paper on **The Judicial Functions of Surveyors** stated that, "...the surveyor is to search for evidence, and that means all the evidence available of the particular boundary.... He is not to assume that a monument is lost until he has thoroughly sifted the evidence and found himself unable to retrace it." He further stated that, "the surveyor must inquire into all the facts; giving due prominence to all the acts of the parties concerned... and that courts and juries may be required to follow after the surveyor over the same ground and that is exceedingly desirable that he govern his actions by the same lights and rules that will govern theirs." This prolonged search for evidence is almost always the rule in Nova Scotia, rather than the exception. On woodlot surveys, land surveyors spend a significant portion of their time searching for and analysing physical and documentary evidence. Often, the verified evidence of a knowledgeable citizen may be all that a surveyor can find to define the location of a line.

Boundary lines that are allowed to fall into a state of neglect are extremely difficult to find and re-establish and become more costly to survey with each succeeding year. If such lines were surveyed and tied into some permanent markers such as the Nova Scotia coordinate monuments, then any further relocation of the boundaries would be for the most part a mathematical exercise. In essence, a proper boundary line survey is an investment in the future.

The cost of boundary surveys is rising rapidly. Woodland operations are being postponed in some cases because of survey costs or the landowners are proceeding with their plans and investments without first knowing the extent or location of their lot. A "gentleman's agreement", or a friendly neighbourhood understanding for the location of property lines, is common throughout much of Nova Scotia. This situation usually prevails until one or more properties change hands. Then the matter often ends up in court - for what turns out to be an expensive solution for all parties concerned.

There are no easy answers to the problem of accurately defining and maintaining woodlot boundaries. A form of government grant or subsidy is clearly desirable. A revision to the Registry Act or perhaps a new Land Titles Act calling for compulsory land registration, and accurate surveys and deed descriptions prior to a land transfer would even be a more positive step forward. Certainly, something should be done. Many of Nova Scotia's woodlot boundaries keep "disappearing" each year, and the cost of re-establishing these lines is rising beyond the landowner's ability to pay. These problems may well mitigate against forest management in future.

Competing Land Uses

The forest lands of Nova Scotia presently constitute approximately 80% of the land area. This figure has fluctuated fairly widely in the recent past and has increased significantly in the last 50 years or so. However, other uses have resulted in a diminution of the forest land base from time to time, and some reduction of the area presently under forest cover can be expected in future.

Urbanization is the most damaging threat to any land based resource, as the land is permanently lost to its original use. Recent urbanization in Nova Scotia is not the result of growth in our towns and cities. During the last census period (1976 to 1981), total population increased 2.2% to 847,442 persons. Nova Scotia experienced a net in-migration of population during this period. At the same time, the population living in towns and cities actually declined by 0.3%, while the population of the rural muncipalities increased by 2.2%.

Much of the rural population growth is linked to economic activity in our major centres. Lower taxes, greater availability of land and a fairly high standard of roads and highways have apparently made rural living more attractive. This is a continuation of past trends. During the decade from 1971 to 1981, urban population growth has been 2% while the non-urban population has grown 15%. Non-urban population now accounts for 45% of the provincial total.

Much of the land use impact resulting from this pattern of growth will be felt in a secondary way in the forestry sector. Rural non-forested land such as farm and pasture land is often the first choice for conversion to residential use, and these displaced activities then turn to forest land for a new base.

The clearing of corridors and rights-of-way for highways and transmission lines has also resulted in the removal of forest land from production. Again, accurate measurements are not available, particularly since some portion is reverting back to forest with abandonment of older lines and rights-of-way.

As a land use activity, agriculture has been a declining threat to forestry. Indeed, much of our current forest was at one time farm land. The area of active or improved farm land in Nova Scotia has declined from 902 450 ha (2,229,051 acres) in 1961 to 493 312 ha (1,218,480 acres) in 1976. Nevertheless, there is potential for land competition from this sector, primarily for the highest capability land. This pressure will tend to be concentrated around the fringes of the major farming districts, and cooperation between forestry and agriculture should be maintained to avoid the possibility of conflicting development programs.

The largest holdings of specifically recreational land are the two national parks in the province, totalling some 83 250 ha (205,620 acres) of forest land. Under Provincial Crown ownership, 13 995 ha (34,567 acres) are currently being held in "Park Reserve" of which 8 670 ha (21,415 acres) is yet undeveloped. On private land 3.7% of the forest area had recreation identified as the main reason for ownership in a recent Department survey of owners. Except for the federal lands, forest management is not specifically excluded from these areas.

Maintaining the forest land base is important, but, as noted above, it does not, in itself ensure that the land is making a contribution to either the economic or social benefits that can accrue from the forests.

The institution of flat rate taxation of forest lands in 1978 is presumed to have removed the element of self-fulfillment associated with the "highest and best use" approach to taxation taken previously. Incentives available under Federal/Provincial Agreements have served to interest many owners in the potential of their holdings. The Group Venture approach provides a means of managing properties for absentees as well as for those owners who are unable to arrange for management on an individual basis. The combination of these incentives should serve to reduce the non-participation rate over time.

As indicated above, who owns the land in less important than whether or not it will be available for forest production. However, it is assumed that non-resident ownership can have both direct and indirect impacts on the availability of forest land. Not least of these is the effect that increased competition and speculative activity can have on the price of land and the ultimate use of the land.

The Deputy Ministers' Committee on Land Use Policy exists to coordinate government resource and physical development activities, public protection regulations and standards, and financial arrangements as they affect land use. While some erosion of the forest land base may still occur, it will be noted that the area regarded as productive forest land has increased significantly over the past half century.

The greatest potential impact on land use is dependent upon the attitudes and actions of owners. In theory it is possible to regulate land use and zone areas specifically for forestry purposes. This is usually done through the municipal planning process. This process is not well advanced in Nova Scotia and it is difficult to determine whether forest management would benefit from comprehensive zoning.

Summary

The commitments made on Crown lands, land acquisition, possessory claims, the role of Crown lands in forest industry development and the uncertainies associated with private ownership have been examined in the foregoing.

Three methods have been employed in allocating the Crown land harvest:

- Long term license agreements with pulp and paper companies;
- License agreements under Section 79A of the Lands and Forests Act;
- Direct management by the Department of Lands and Forests (tender sales, permits, etc.).

There are two long term license agreements with pulp and paper companies. These agreements were negotiated at the time the mills were established. Together, they commit 38% of the wood requirements of the mills involved.

License agreements under Section 79A of the Lands and Forests Act have been negotiated with several sawmills and a hardboard mill since 1974.

The remaining Crown lands are under direct management by the Department.

While comprising less than one-quarter of the productive forest lands in Nova Scotia, Crown Lands have been a significant factor in forest industry development. The allocation of the Crown land harvest has been very significant in terms of industrial development, employment and incomes, as well as in terms of forest management on all ownerships. However, existing commitments on Crown land will require most of the harvest from the larger blocks in future.

The Department has been acquiring forest land by purchase since 1937. Over the years approximately 400 000 ha (1 million acres) of land have been acquired.

These lands have contributed significantly to industrial development efforts.

There are about 121 000 ha (300,000 acres) of land where the Crown's title is in question. These lands were never granted but are believed to be subject to possessory claims. The procedure for settling claims is expensive and time consuming.

Ungranted land is land which, practically speaking, has an ambiguous legal status and hence cannot be utilized to its full resource potential. Related problems necessitate an efficient and speedy determination of the status of ungranted lands. Thoroughness and a fair review of a claimant's legal rights must not, however, be sacrificed to accommodate a desire to expeditiously resolve this issue.

The problems related to ungranted land are a result of the Crown's failure to establish the private/Crown status of land over a century ago. Immediate solutions are therefore not practical, nor should they be expected. At the same time, progress, especially in recent years, has been encouraging.

While it is assumed that the larger private ownership are likely to continue to contribute to the forest harvest in future, the smaller ownerships present particular difficulties in estimating the future availability of wood. Based on an analysis of recent survey data, it is suggested that the available land in the small private category should be estimated at approximately 60% of the total, or roughly 1.3 million hectares (3.2 million acres).

Difficulties in locating many privately owned woodlots on the ground and lack of attention to boundary line maintenance over the years further complicate the management of privately owned lands.

Competing uses, such as urbanization, farming, and transmission lines will cause some erosion of the forest land base in future.

4. FOREST INDUSTRIES OF NOVA SCOTIA

The evolution of the forest industries of Nova Scotia was mentioned briefly in preceding chapters. In this chapter the value of the sector is analysed, recent trends are identified and the socio-economic impact is discussed. The prospects for future development in the sector are also evaluated.

The 4 100 000 ha (10.2 million acres) of forest land in Nova Scotia support one of the economic mainstays of the province. The gross value of production in the forestry sector now exceeds $500 million annually and accounts for 4.3% of the Gross Provincial Product.

Forestry activity has an impact in all areas of the province in both rural and urban economies. In many of our smaller centres it is the major employer.

The sector is usually analysed on the basis of two components: the management, harvesting and transporting of timber; and the processing of this timber into manufactured products from sawn-rough lumber to finished furniture, and from pulp to newsprint.

The processing of timber products provides over two-thirds of the sector's employment. The pulp and paper segment is the most significant in terms of value of production, employment and wood requirements, utilizing over 70% of the harvest. The wood processing industry accounts for 16% of employment in the manufacturing sector and 14 per cent of output. However, since the sector is clearly resource-dependent, future development is tied to the availability of raw material.

In the late 1960's and early 1970's significant growth occurred in the sector, despite generally difficult market conditions. During this period harvesting increased by more than 50% with a commensurate increase in the value of shipments (Table 1). As Table 1 shows, shipments reached an all time high of $504.9 million in 1981.

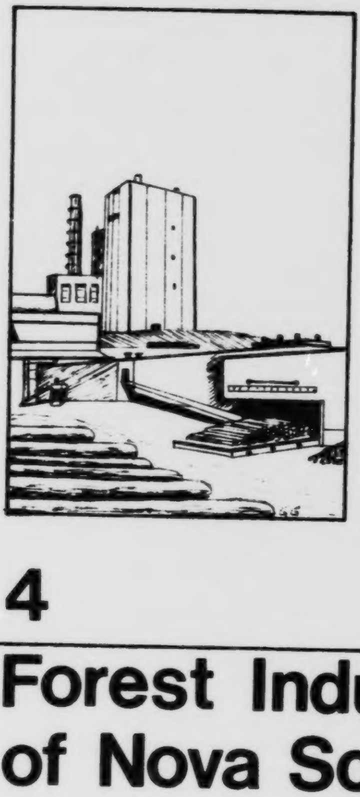
Forest products are a significant export commodity with the trend over the past 11 years reflected in Tables 2 and 3. As Table 3 indicates, the value of exports to international destinations exceeded $350 million in 1981. While not reflected in the table, this represented close to 30 per cent of all such exports from Nova Scotia.

The last decade or so has also seen the development of a silviculture sub-component in the sector, as new employment opportunities have been created in the supply of services and materials for forest improvement work, forest nurseries and forest protection. Much of this activity has resulted directly from the Canada/Nova Scotia Subsidiary Agreement for Forestry, now being continued under the Forest Resource Development Agreement. It is estimated that in 1981 130,000 man-days of employment were created directly by the Subsidiary Agreement.

Sawmills

Sawmill production clearly suffered during the early years of the Great Depression (Figure 22). Sawmilling picked up significantly during the late 1930's and early 1940's, declined in the late stages of the second World War and responded strongly to reconstruction in Europe with a peak production of over 450 million f.b.m. being recorded in 1947. After 1955 production fell steadily, dropping below 200 million f.b.m. in 1967. Since then production has remained fairly constant at around 200 million f.b.m.

The number of mills declined more or less in line with production. In the peak post-war years over 800 mills were operating in the province. This number declined to around 350 in 1970, and has remained fairly constant since then. During the past decade the number of mills sawing more than



4

Forest Industries of Nova Scotia

TABLE 1

VALUE OF SHIPMENTS BY FORESTRY SECTOR - NOVA SCOTIA

CURRENT $ '000

	1970	1971	1972	1973	1974	1975
Primary Forestry						
Logging - Value of Shipments[1]	28,537	31,189	33,033	43,672	60,689	58,603
Secondary Forestry						
Wood Industries[2]	28,140	29,083	35,451	42,939	52,080	58,001
A. Sawmills[3]	20,529	20,056	23,668	28,339	29,076	29,098
B. Other Wood[4]	7,611	9,027	11,783	14,600	23,004	28,903
Paper & Allied Industries[5]	88,214	94,753	113,728	147,890	211,627	218,197
A. Pulp & Paper[6]	75,739	80,936	99,906	126,869	189,108	186,306
B. Other Paper Allied[7]	12,475	13,817	13,822	21,021	22,519	31,891
Total Secondary	116,354	123,836	149,179	190,829	263,707	276,198

	1976	1977	1978	1979	1980	1981
Primary Forestry						
Logging - Value of Shipments[1]	55,009	71,712	80,635	92,346	100,064	
Secondary Forestry						
Wood Industries[2]	67,478	67,651	85,921	91,571	87,574	97,910*
A. Sawmills[3]	32,922	34,697	44,133	49,138	46,707	
B. Other Wood[4]	34,556	32,954	41,788	42,433	40,867	
Paper & Allied Industries[5]	222,692	256,747	281,427	315,507	398,743	407,045*
A. Pulp & Paper[6]	186,162	217,072	238,053	278,621	352,680	
B. Other Paper Allied[7]	36,530	39,675	43,374	36,886	46,063	
Total Secondary	290,170	324,398	367,348	407,078	486,317	504,955

Statistics Canada: [1] 25-201

[2] 25-202, *31-001

[3] 35-204

[4] (2)-(3)

[5] 25-202, *31-001

[6] 36-204

[7] (5)-(6)

TABLE 2

NOVA SCOTIA FOREST RELATED EXPORTS, 1970 TO 1975

VALUE OF EXPORTS - CURRENT DOLLARS

EXPORT COMMODITY GROUP	1970	1971	1972	1973	1974	1975
Logs, Round and Roughly Squared	1,670	7,728	9,485	2,963	10,307	24,954
Pulpwood & Pulpwood Chips	3,255,507	1,898,308	1,803,689	1,962,792	2,287,827	2,660,918
Other Crude Wood Materials	1,122,177	975,075	1,139,240	1,426,118	1,371,070	1,411,148
Lumber	4,351,975	2,956,896	2,471,921	2,601,430	6,225,843	3,403,380
Other Sawmill Products	172,968	86,116	93,641	194,492	97,272	62,059
Millwork	47,147	68,110	111,888	35,777	28,159	44,139
Other Wood Fabricated Material	57,582	113,812	19,429	64,045	82,915	82,668
Wood Pulp & Similar Pulp	38,904,912	42,260,604	38,875,789	47,901,827	85,736,873	92,782,544
Paper for Printing	22,080,457	26,886,029	33,971,169	48,705,067	63,550,838	66,429,428
Paperboard	973,430	1,403,178	2,616,844	2,470,101	3,606,357	2,916,959
Bldg. Paper	2,254,093	2,619,056	6,592,627	10,033,039	6,716,878	2,911,758
Converted Paper	3,900	80,817	----	132,973	95,138	11,609
Total	73,276,694	76,825,909	87,705,722	115,530,534	169,809,475	166,423,660

SOURCE: Nova Scotia Department of Development, Estimates from Statistics Canada Laden Tabulations.

TABLE 3

NOVA SCOTIA FOREST RELATED EXPORTS, 1976 TO 1981

VALUE OF EXPORTS - CURRENT DOLLARS

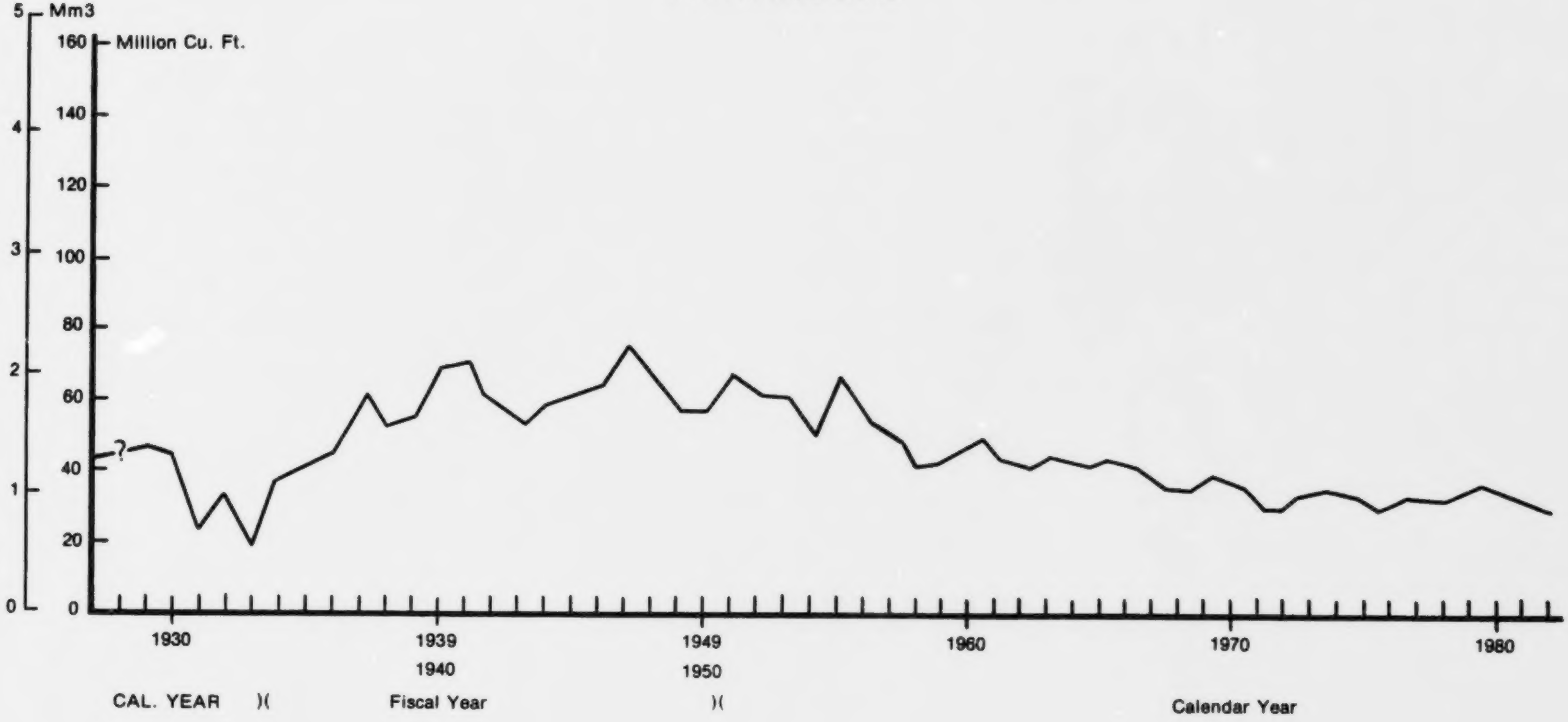
EXPORT COMMODITY GROUP	1976	1977	1978	1979	1980	1981
Logs, Round and Roughly Squared	1,035	16,071	75,963	85,649	72,113	153,467
Pulpwood & Pulpwood Chips	2,966,695	2,709,028	1,972,338	3,448,749	3,052,640	6,563,014
Other Crude Wood Materials	1,771,381	2,025,400	2,534,974	3,715,374	4,188,541	4,892,385
Lumber	3,730,995	6,456,220	8,374,094	17,544,590	14,975,541	14,020,823
Other Sawmill Products	10,859	1,124	46,620	36,735	11,134	615,718
Millwork	51,309	65,366	103,792	121,449	118,046	464,711
Other Wood Fabricated Material	100,475	247,682	385,381	372,871	660,670	1,159,734
Wood Pulp & Similar Pulp	85,907,844	102,585,433	99,459,317	122,780,804	159,714,088	171,930,928
Paper for Printing	67,727,774	83,323,835	102,528,500	107,288,534	122,383,928	145,672,156
Paperboard	2,870,147	1,882,569	3,689,626	5,349,946	4,709,908	3,265,700
Bldg. Paper	1,237,211	497,964	829,298	1,806,546	6,042,176	3,287,785
Converted Paper	772,550	34,005	31,332	27,375	212,233	181,679
Total	166,448,275	199,844,697	220,047,480	262,578,622	316,153,232	352,208,100

SOURCE: Nova Scotia Department of Development, Estimates from Statistics Canada Laden Tabulations.

FIG. 22

NOVA SCOTIA COMMERCIAL FOREST PRODUCTION

SAWN PRODUCTS



1 million f.b.m. annually remained fairly constant. However, this group increased its share of total production from 79% in 1970 to 82% in 1981. At the other end of the scale the number of mills sawing less than 100,000 f.b.m. annually increased from 158 to 207 between 1970 and 1980, although the share of total production accounted for by this category declined marginally from 3% to 2.5%.

The foregoing would suggest a trend to slightly larger production units for the mills producing over 1 million f.b.m. annually. The mills in the larger category are likely to be more efficient and produce for a greater part of the year.

Nova Scotia sawmills have been technically less sophisticated and more labour intensive than other mills in Canada, producing only 55% of the national average output per man-hour. Wage levels have remained commensurately low, giving our mills competitive labour costs. Wages to sawmill workers are 80% of the Nova Scotia Industrial Composite average wage. Nova Scotia mills have typically enjoyed a premium in their selling prices compared to other regions, particularly during weak markets, by making a higher proportion of sales to final users rather than to brokers or wholesalers. Therefore, they appear to fare reasonably well in terms of overall productivity (value added/m^3 processed) and profitability (gross rent/m^3) compared with national producers.

A number of sawmills in the province took advantage of the Sawmill Improvement Project under the Subsidiary Agreement for Forestry. This Project offered incentive grants to those mills proposing to adopt improved technology, affording better utilization and safety and working conditions. During the term of the Agreement some 11 mills took advantage of this program which complemented assistance from more conventional sources such as Regional Development Incentive Act grants and loans from the Nova Scotia Resources Development Board. Thus, in a brief 5 years almost one-quarter of the sawmilling capacity in the province was significantly upgraded.

Recent production levels are approximately equal to the requirement for sawn products within the province. In practice, less than 70% of production is used within the province. The balance of production is exported to international destinations or shipped to other provinces. The remaining domestic demand has been satisfied by shipments from elsewhere in Canada.

The value of sawn product shipments is now estimated to be in excess of $50 million annually. Total employment in the sawmill segment is estimated at 2,400 man-years annually, including harvesting, or approximately 30% of total direct employment in the forestry sector. It should be noted that sawmills are well distributed throughout the province and provide employment opportunities in small communities and rural areas where job alternatives are scarce. Moreover, sawmills provide ancillary benefits to local communities in the form of custom and contract sawing and also provide sawn material to secondary wood-using industries, further stimulating employment and incomes. These benefits are difficult to quantify.

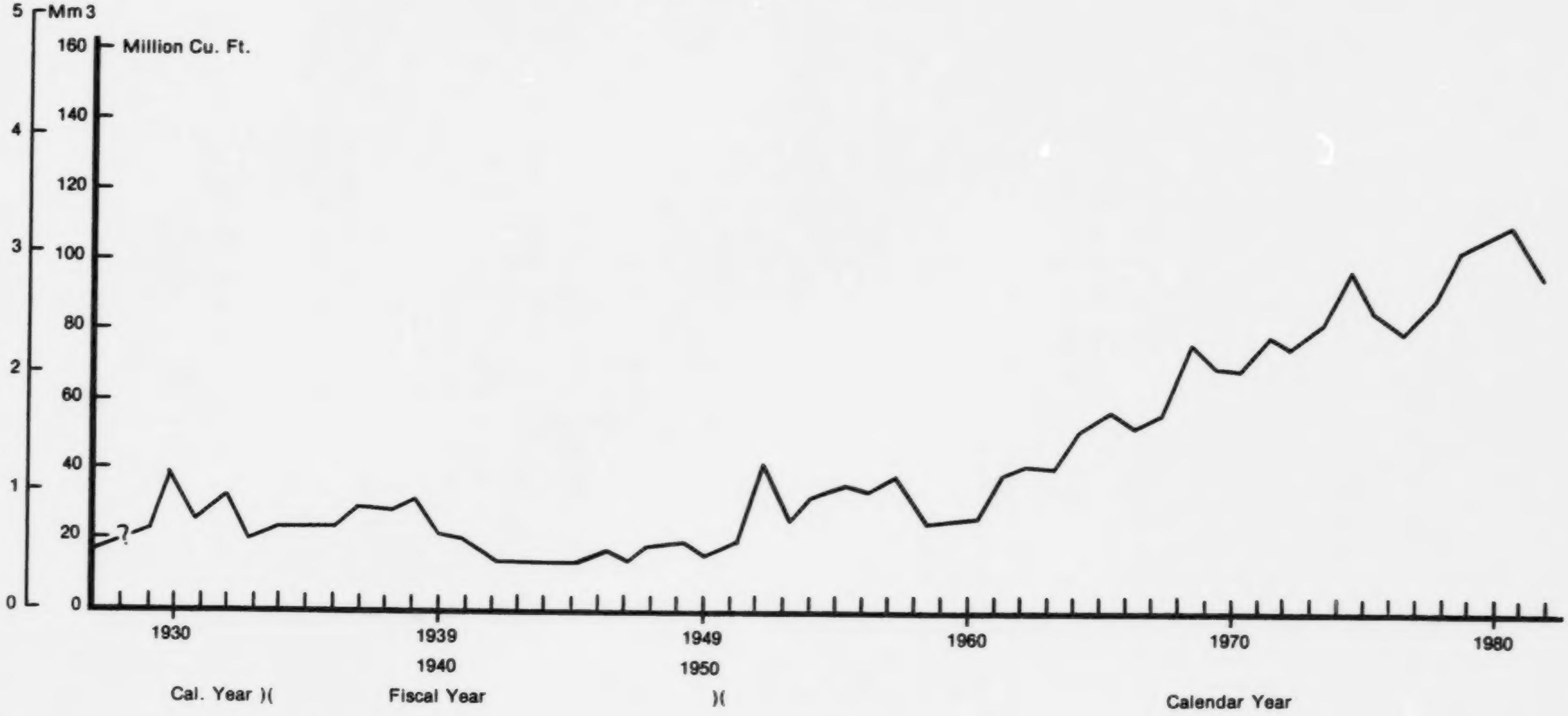
Pulp and Paper

As indicated earlier in this report, pulp and paper manufacturing became an important component of the forestry sector in the 1920's. However, significant growth in this segment of the industry did not occur until the 1960's. In that decade 3 new mills were established and subsequently expanded (Figure 23).

At present, the pulp and paper segment of the industry is comprised of 5 mills -- a kraft pulpmill at Abercrombie Point with an annual capacity of 190 490 t (210,000 tons) operated by Scott Maritimes Limited, a sulphite pulpmill and newsprint mill at Point Tupper with a combined annual capacity of 294 800 t (325,000 tons) operated by Nova Scotia Forest Industries; a newsprint mill at Liverpool with an annual capacity of 158 740 t (175,000 tons) operated by Bowater Mersey Paper Co. Ltd., a paperboard mill at

FIG. 23

NOVA SCOTIA COMMERCIAL FOREST PRODUCTION
ROUND PRODUCTS



Hantsport with an annual capacity of 31 740 t (35,000 tons) operated by Minas Pulp and Power Ltd., and a hardboard plant at East River an annual capacity of 29 730 000 m^2 (320,000,000 $ft.^2$) - 1/8" basis, operated by Masonite Canada Limited.

The pulp and paper segment provides an estimated 5,600 man-years of direct employment, including harvesting and related activities. The mills are located in smaller urban centres and in most cases represent the major employer in the area.

Wages in this sector are largely determined by industry-wide bargaining. Wages to mill workers are 150% of the Nova Scotia Industrial Composite average wage. The mills are fairly modern and technically efficient. Aided by relatively favourable wood costs, our producers are believed to be competitive within the industry on both a productive ($\$VA/m^3$) and profitability basis. Prices paid for residue chips are relatively low; however, the size of the sawmill sector limits the ability to exploit this advantage. Chips represent only 10% of total furnish in Nova Scotia, but for the total Canadian industry have grown to 50%.

Shipments of pulp and paper are now valued at over $400 million annually, almost all of which is shipped out of the province. The pulp and paper industry is ranked second in value added for leading manufacturing groupings.

The pulp and paper mills in Nova Scotia are taking advantage of incentive grants under the Canada/Nova Scotia Pulp and Paper Modernization Agreement, to undertake modernization, pollution abatement and energy cost reduction projects aimed at making the industry viable over the longer term. At the same time, Nova Scotia Forest Industries is expected to continue to explore the possibility of utilizing a greater proportion of hardwoods to offset softwood losses resulting from the continuing spruce budworm infestation.

Christmas Trees and Maple Syrup

While the pulp and paper and sawmill segments are the most important components of the province's forest industry, Christmas trees and maple syrup are also significant. The Christmas tree industry now makes a \$7-\$8 million contribution to the provincial economy, with approximately 1.6 million trees harvested annually. The industry provides a significant level of seasonal employment in rural areas and provides an additional cash crop for many small woodlot owners, especially in Lunenburg, Antigonish and Guysborough counties. Over 42 000 litres of maple syrup are harvested annually as well.

Exports of Roundwood

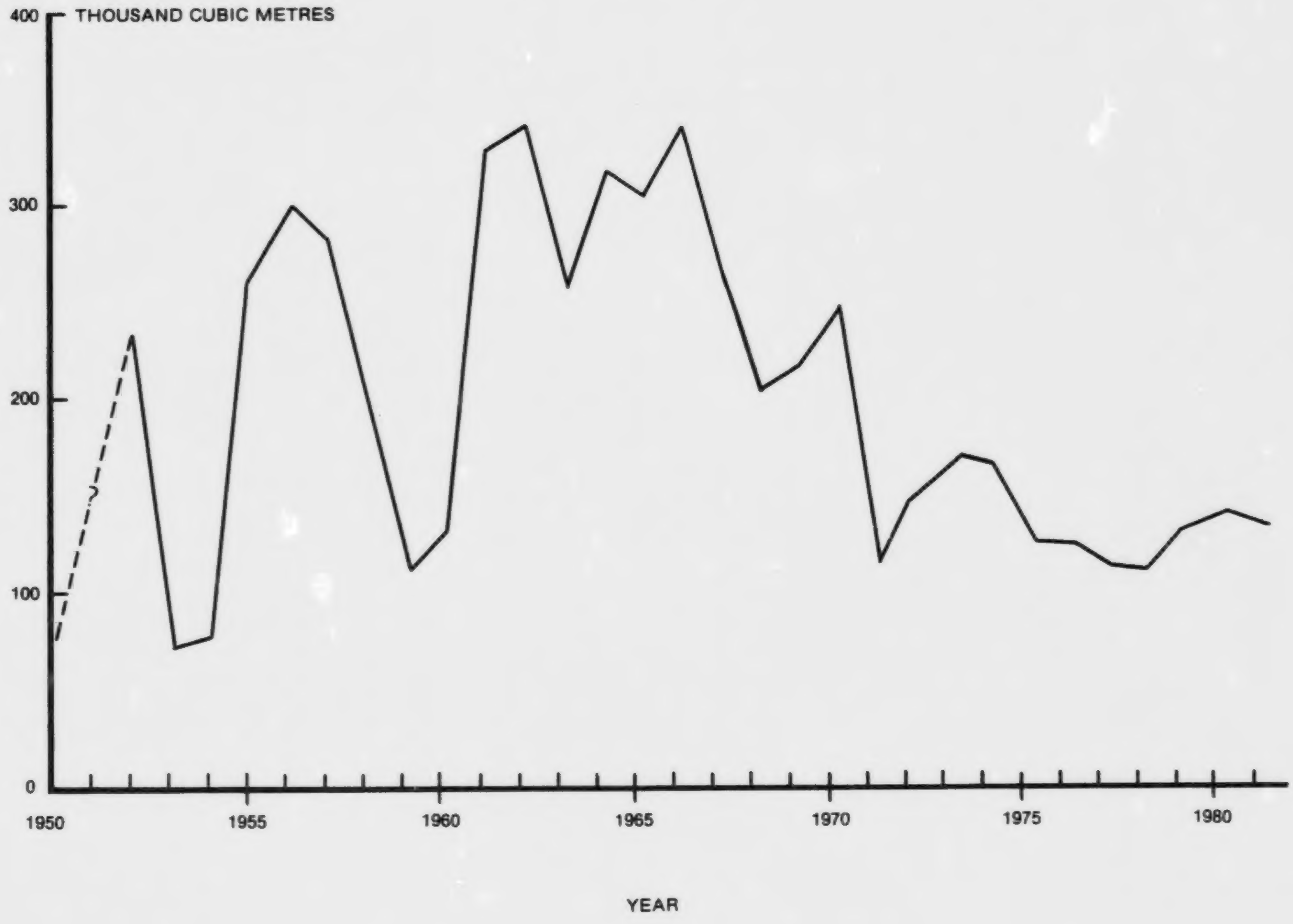
Exports of round or crude wood have been an important component of the sector over the years, especially for small private producers who have found it attractive and convenient to sell pulpwood to exporters. Export volumes are included in pulpwood harvested (Figure 23) and tend to distort the trends discussed in the pulp and paper segment. In order to isolate the role of exports in the sector, data on volumes are reflected in Figure 24.

As will be noted, exports of unprocessed wood (pulpwood) reached a high of over 358 000 m^3 (160,000 cords) in 1966. Exports dropped sharply in 1971 and have remained fairly constant at less than 150 000 m^3 (around 60,000 cords) over the past 10 years. The decline indicated is believed to be a direct result of the alternative new domestic markets associated with the start-up of the Scott Maritimes Ltd. mill in 1967 and the expansion of the Nova Scotia Pulp Ltd./Nova Scotia Forest Industries mill, which came on stream in 1971.

While export markets are attractive to the small producer, it is worth noting that these markets require a

FIG. 24

EXPORT OF PULPWOOD AND CRUDE WOOD OF NOVA SCOTIA ORIGIN



premium grade of wood and yield a much lower total economic benefit for the province per unit of wood produced.

As noted elsewhere in this report, good quality wood is expected to be in increasingly short supply in future years. An ambitious forest management effort is required to sustain the harvest at existing levels. To maximize benefits, it would also be preferable to have as much wood as possible processed in the province.

Comparative Impact

As indicated in Figure 25, the forestry sector provides an estimated 8,000 person-years of direct employment in the province. Since there are several thousand small producers who periodically harvest their woodlots, the actual number of individuals deriving at least part of their income from the sector is considerably greater.

Selected comparative direct impact multipliers are presented in Table 4. Per unit of wood processed, the sawmill sector is more labour intensive and provides more jobs. The pulp and paper sector produces a higher value product, has higher paying jobs, earns more value added and pays more taxes per unit of wood processed. It may also be inferred from these data that exports of roundwood and harvesting for fuelwood produce a lower economic benefit per unit of wood than processing into pulp, paper and sawn products.

FIG. 25

DIRECT EMPLOYMENT
FOREST SECTOR 1980

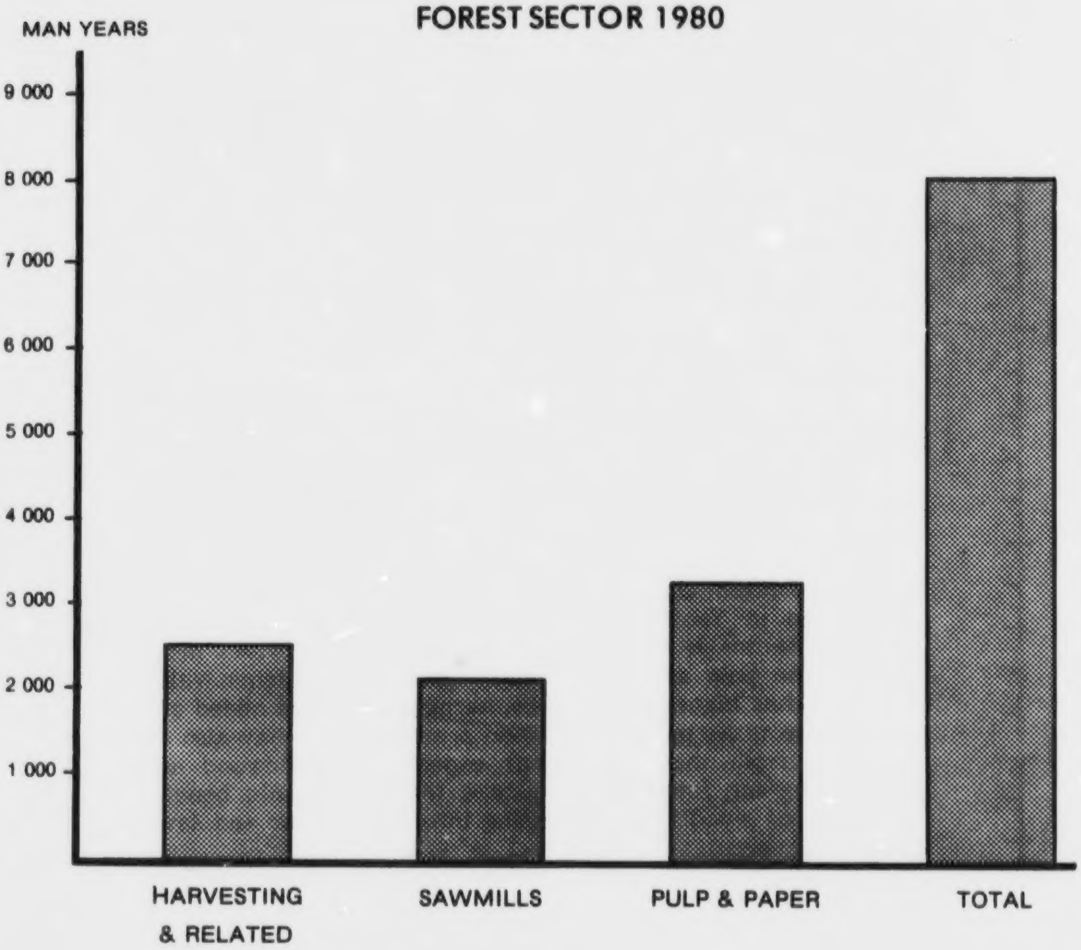


Table 4

COMPARATIVE ECONOMIC CRITERIA FOR MAJOR FORESTRY COMPONENTS - 1980 - NOVA SCOTIA

Economic Criteria/ Industry	Logging	Sawmills	Pulp & Paper
Sales: $\$/\mathrm{m}^3$ (1)	22.02	83.21	117.58
Employees/1000 m^3	0.24	1.28	0.83
Labour: man hours/m^3	0.39	2.37	1.36
Salaries: $\$/\mathrm{m}^3$	3.38	15.48	18.82
Value Added: $\$/\mathrm{m}^3$	5.52	25.84	67.00
Salaries: $/40 man hrs.	251.49	214.49	394.43
Value Added: $/40 man hrs.	585.33	434.50	1972.43
Fiscal Income: $ Taxes/m^3 (2)	0.59	2.55	4.67

(1) Raw Material
(2) Direct taxes, all governments

SOURCE: Statistics Canada - Survey of Manufacturers.

This comparison does not necessarily fit the general perception of wood suppliers. They can be expected to measure the value in terms of roadside or stumpage prices. Thus, it is not surprising that export or fuelwood markets will appeal to many suppliers.

Each goods-producing sector in the economy supports indirectly many other jobs and incomes. A variety of economic multipliers taken from the 1979 Input-Output Study of Nova Scotia are given in Table 5. The three main segments in the forestry sector compare very favorably with other sectors in the provincial economy.

Table 5

NOVA SCOTIA MULTIPLIERS [redacted] 1979

	FORESTRY	SAWMILL	PULP & PAPER
Total output value per dollar industry output.	2.6306	2.6181	2.6261
Net ouput value per dollar industry ouput	1.9590	1.9542	2.0317
Household income generated per dollar output	0.6717	0.6638	0.5945
Household income generated per dollar industry wages	2.0760	2.1034	2.3540
Municipal Gov't revenues per dollar industry output	0.0270	0.0254	0.0259
Provincial Gov't revenues per dollar industry output	0.0928	0.0987	0.0907
Employment per $1000 industry output	0.0512	0.0486	0.0337
Total employment per industry employee	1.8912	1.9820	3.1741
Income per employee index	13.1193	13.6521	17.6182

Future Development Opportunities

The primary concern in the sector is with longer-term supply prospects for softwoods, especially in eastern Nova Scotia. As discussed in Chapter 7, the projected shortfall could be reduced to manageable proportions with an appropriate level of silviculture and greater utilization of hardwoods. Moreover, there may be a limited opportunity for expansion in hardwoods, and to some extent softwoods, depending upon the level of silviculture maintained. Nevertheless, the first priority must be to maintain existing industry.

The sawmill sector warrants particular consideration. As indicated in Chapter 2, the quality of the resource is a very real constraint. The softwood sawlog component in the growing stock is more or less in line with annual sawmill requirements. However, the independent sawmills collectively control a relatively insignificant proportion of forest land in the province, leaving them heavily dependent upon pulp and paper companies, Provincial Crown and woodlot owners for much of their raw material requirements. Moreover, spruce budworm losses, particularly in Cumberland County, may have a pronounced adverse effect on the supply of sawlogs in that part of the province.

Alternatively, the hardwood species afford very limited potential for expansion in sawmilling, given the obvious constraints.

The pulp and paper segment is also faced with serious supply constraints. These are compounded by the continued catastrophic losses as a result of the spruce budworm infestation. Nova Scotia Forest Industries, to maintain existing production levels, must soon find a means to use significantly more hardwoods. Moreover, supply problems in eastern Nova Scotia will have an adverse impact on central and western regions where expansion might otherwise be feasible.

On a brighter note, considerable growth in the production and export of Christmas trees appears feasible. Industry spokesmen suggest that a 4 to 5-fold expansion over the next 5 to 10 years may be realistic. Expansion in Christmas tree production will depend primarily on product quality and the availability of export markets.

Also on the positive side, there may be considerable potential for energy generation from presently underutilized harvesting residues. A study in progress suggests that the equivalent of at least 1 800 000 m^3 (800,000 cords) may be available and accessible for such use. However, it has yet to be demonstrated that these wood wastes can be extracted and delivered at a price competitive with conventional fuels, although direct combustion for industrial and institutional purposes may well prove to be cost-effective. The estimated value of these wood wastes as fuel is in the order of $50 million annually.

Paradoxical as it may seem, it is also apparent that there is at present a temporary oversupply of softwood pulpwood in Nova Scotia. This temporary bulge in supply is attributable to a variety of causes. These include weak markets for pulp, paper and sawn products, a perceived need to harvest insect-killed stands, accelerated silviculture programs, and a general downturn in the economy. These conditions create a tendency for people to turn to the production of pulpwood as a supplementary source of income.

In this situation it is not surprising that those directly affected will make demands for new markets to absorb the temporary surplus of wood. However, the surplus must be viewed as a temporary phenomenon. In the longer term all available wood in the province will be required to maintain current industrial capacity. Any existing surplus is insect salvaged wood that is not marketable offshore and which is most unlikely to form the basis for any new industrial capacity.

Summary

The forest resources of Nova Scotia support a well developed and varied forest industry. Currently, with a labour force in excess of 8,000 direct and an estimated 16,000 indirect jobs, the industry produces a wide range of products; namely pulp, newsprint, paperboard, hardboard and various lumber products. This is accomplished through utilization of an annual harvest exceeding 3 700 000 m^3 (1.7 million cords). In addition, the province produces approximately 1.6 million Christmas trees and over 42,000 litres of maple syrup annually. These latter activities require a labour input roughly equivalent to 250 full-time jobs.

Total forestry-related shipments are now valued at more than $500 million annually. However, given the present status of the resource, serious problems may be encountered in maintaining recent production and employment levels.

The softwood sawlog component in the growing stock is more or less in line with annual sawmill requirements. However, the independent sawmills collectively control a relatively insignificant proportion of forest land in the province, leaving them largely dependent on pulp and paper companies, Provincial Crown and woodlot owners for most of their raw material requirements. Moreover, spruce budworm losses, in Cumberland County in particular, may seriously reduce the supply of sawlogs.

Alternatively, the hardwood species afford very limited potential for expansion in sawmilling, given the obvious quality constraints.

The pulp and paper segment is also faced with serious supply constraints. The bleak supply picture is made bleaker by the continued catastrophic losses as a result of the spruce budworm infestation. To maintain existing production levels, Nova Scotia Forest Industries must find a means to use significantly more hardwoods in the near future. Moreover, supply problems in eastern Nova Scotia will have an adverse impact on central and western regions where expansion might otherwise be feasible.

On the other hand, considerable growth in production and export of Christmas trees appears feasible. Industry spokesmen suggest that a 4 to 5-fold expansion over the next 5 to 10 years may be realistic. Expansion in Christmas tree production will be primarily dependent on the availability of export markets and a quality product.

Wood wastes may also have considerable potential for energy generation. It is estimated that as much as 1 800 000 m^3 (800,000 cords) may be accessible for energy use. The current value of these wood wastes for energy purposes is estimated to be $50 million annually.

Thus, the overriding concern in the forestry sector is the future raw material supply for pulp, paper and sawn products in order to retain the very significant benefits accruing to the province. Silviculture programs, such as those stimulated by the Subsidiary Agreement for Forestry and being continued under the Canada/Nova Scotia Forest Resource Development Agreement, can dramatically improve the supply picture if maintained at an adequate level.

5

Forest Production

5. FOREST PRODUCTION

As noted elsewhere in this report Nova Scotia is the second smallest province in Canada with a forested area of approximately 4 100 000 ha (10.2 million acres). With a relatively long period of settlement, harvesting, exploitation and lack of attention to forest management, it is reasonable to suggest that our forest resources have been depleted to a greater degree than in most other provinces. Nevertheless, it is worth noting that Nova Scotia ranks third among the provinces in commercial production per unit of productive forest land (Figure 26). As this figure shows, our forests support an annual harvest of approximately 1.1 m^3 per ha of productive forest land (0.20 cords/acre), trailing only British Columbia and New Brunswick.

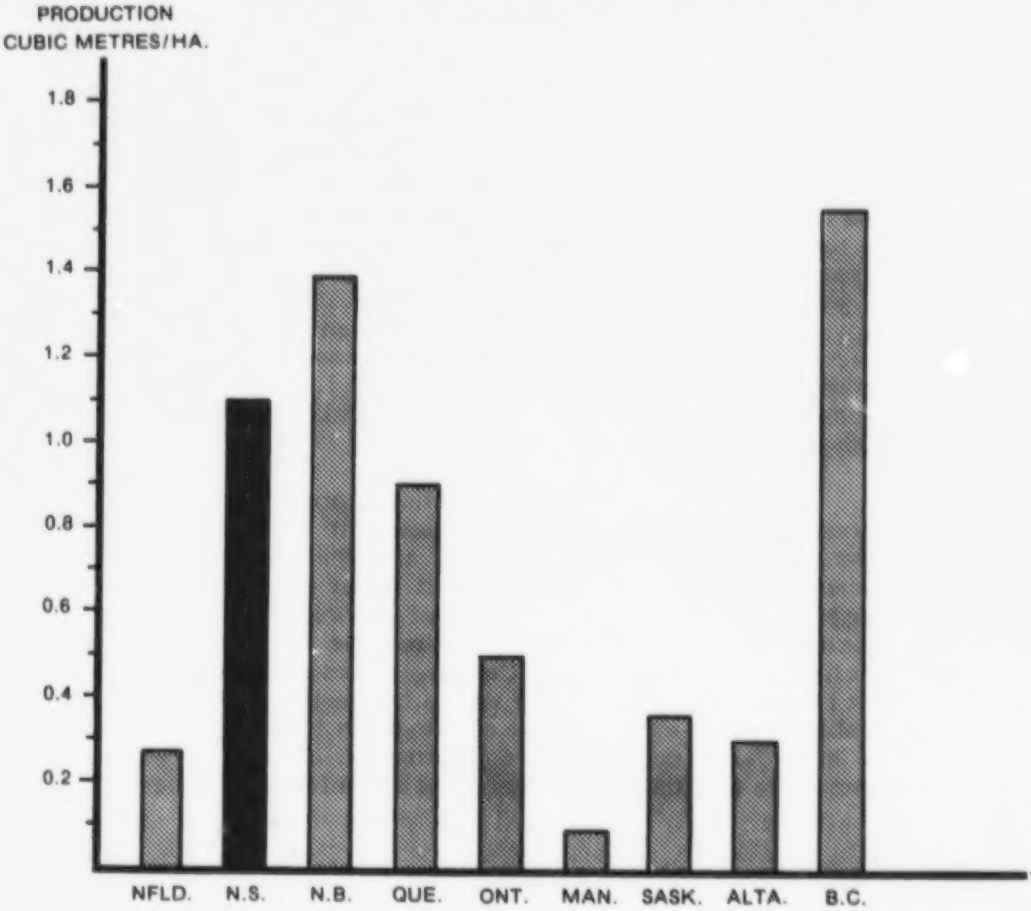
Given the fact that a significant proportion of the forest land in Nova Scotia is believed to be effectively alienated from forest production, and the comparatively minor industrial use of hardwoods, it is not unreasonable to suggest that the industrial harvest of softwoods per accessible unit of productive forest land may be higher in Nova Scotia than anywhere else in Canada. However, the data are not readily available to make such a comparison and we are unable to make any definitive statement in this regard. We do have fairly comprehensive information on the harvest. These data are analysed and discussed in the following pages.

The Industrial Harvest

As outlined in Chapter 1, the forests of Nova Scotia have been harvested for over 200 years. While some

FIG. 26

FOREST PRODUCTION BY PROVINCE



indication of the magnitude of the historical harvest can be gleaned from available records, it was not until after the Lands and Forests Act was passed and the Department of Lands and Forests was organized that reasonably reliable production data were gathered on a regular basis. These data are now compiled annually in compliance with Section 114 of the Act and are published in summary form by the Department as the Nova Scotia Forest Products Directory.

As Figure 27 indicates, the total industrial harvest averaged slightly more than 2 265 000 m^3 (1 million cords) annually from 1935 to 1960. The peak year during this period was 1952 when 3 000 000 m^3 (1.36 million cords) were harvested. Since 1960 there has been a fairly dramatic increase in the annual harvest to an all-time high of over 4 270 000 m^3 (1.9 million cords) in 1980. It should be noted, however, that the 1980 figure included budworm-killed wood salvaged for storage. Exclusive of the net volumes of wood placed in storage, the average harvest for the past 5 years was 3 910 000 m^3 (1.77 million cords) annually. The latter represents an increase of approximately 58% over the average harvest for the 1956-60 period.

Species:

Historically, over 90% of the industrial harvest has been in softwoods. The softwoods were in demand primarily for sawlogs in earlier years and this trend has continued as pulp and paper have become more dominant (Figure 28).

The fluctuations in softwood production are largely accounted for by the changes in the industrial structure enumerated in Chapter 4. The Bowater Mersey Paper Co. Ltd. mill at Brooklyn, Queens Co. accounted for upwards of 30% of the harvest in the early 1930's. A surge in sawmilling resulted in the higher production levels in the late 1930's through the mid-1950's. Sawmilling declined in the late 1950's but new pulp and paper capacity in the 1960's and the early 1970's is reflected in increasing harvests of softwoods. In the late 1970's strong market conditions and a wood storage program in Cape Breton resulted in record high

FIG. 27

NOVA SCOTIA COMMERCIAL FOREST PRODUCTION, 1929 - 1981

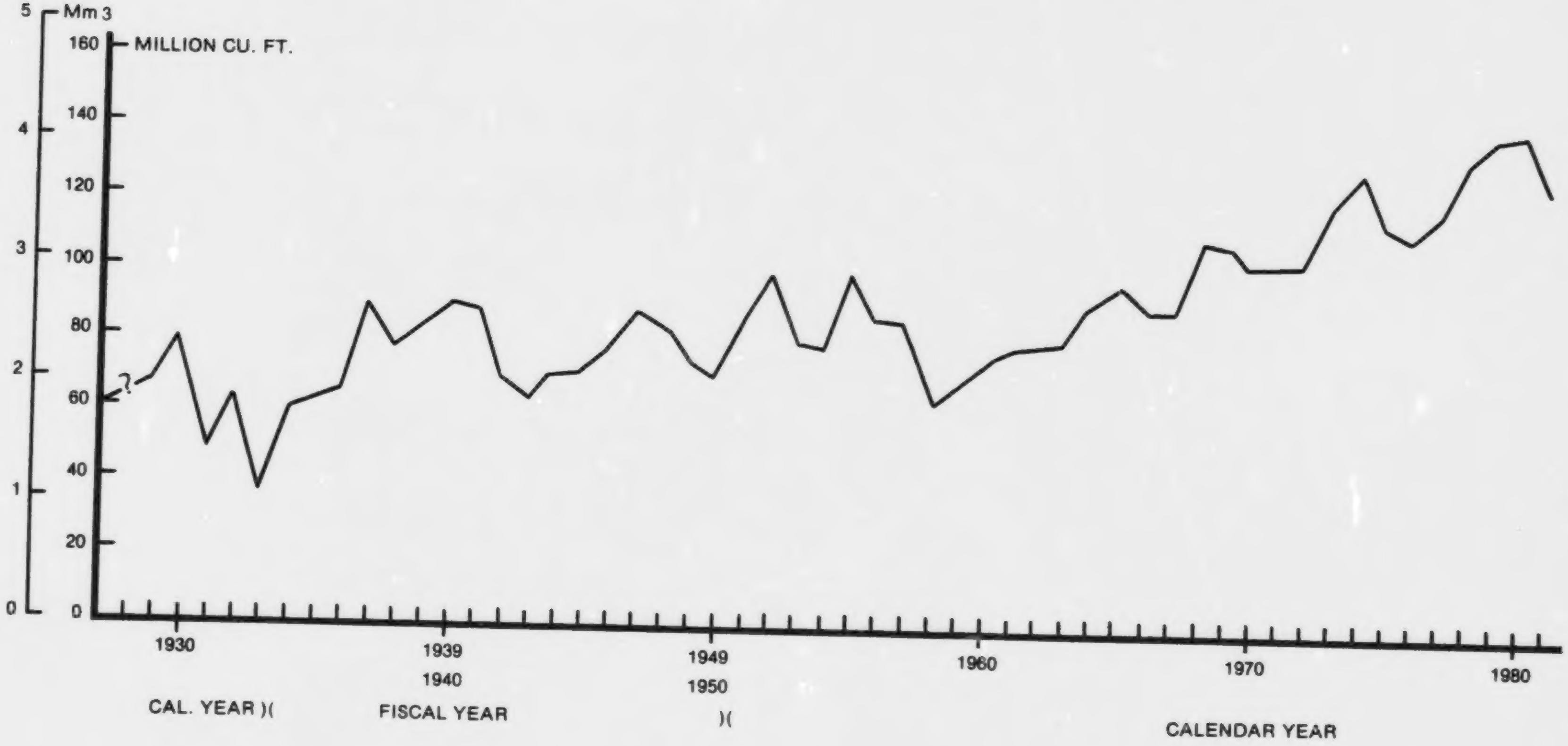
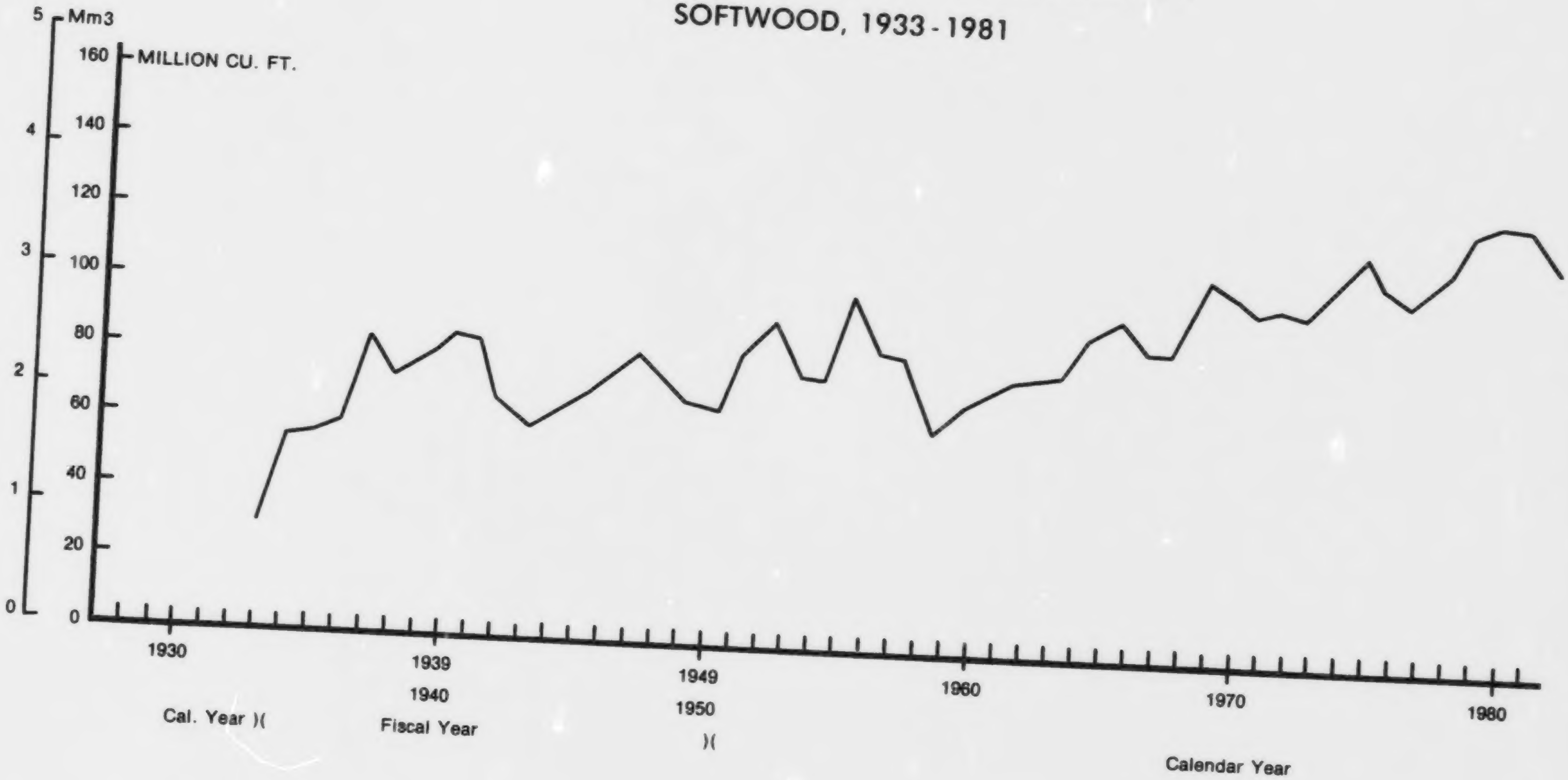


FIG. 28

NOVA SCOTIA COMMERCIAL FOREST PRODUCTION

SOFTWOOD, 1933 - 1981



production levels. By 1981 weak markets marked a cyclical decline.

The demand for hardwoods has never been particularly strong (Figure 29). From 1935 to 1960 the average annual harvest of hardwoods was approximately 179 000 m^3 (81,000 cords), or roughly 8% of the total industrial harvest. The hardwood harvest declined noticeably in the 1950's, presumably due to the effects of birch die-back and the decline in quality of yellow birch sawlogs in particular. Production increased in the late 1960's and early 1970's with the start-up of the Scott Maritimes Ltd. pulp mill and the Masonite Canada Ltd. hardboard mill. Hardwood production reached an all-time high of 523 000 m^3 (230,000 cords) in 1980, representing 12% of the total industrial harvest in that year.

Production by Ownership:

Since 1967, in keeping with the ownership categories discussed in Chapters 2 & 3, the Department of Lands and Forests has followed the practice of summarizing production data by ownership class. These data form the basis for Figure 30 for the period 1967 to 1981. The fluctuations in production reflect the changes in demand occasioned by the increases in productive capacity and cyclical swings discussed previously. Nevertheless, it must also be noted that production on the small private ownerships has not always reacted to these changes in the same way as it has on large private and Crown. In some respects, it would appear that the small private ownerships (less than 400 ha or 1,000 acres) have reacted negatively when demand has been strongest and when total industrial production has peaked.

This apparent anomaly in production suggests that exogenous forces, not readily identifiable from data being analysed, may be at work. For example, it was reported that Nova Scotia Pulp Ltd. encountered difficulty in acquiring sufficient purchase wood in 1973 following the start-up of the newsprint line. This may have been attributable, in part, to a boom in construction in eastern Nova Scotia and a relative abundance of non-forestry employment opportunities. This

FIG. 29

NOVA SCOTIA COMMERCIAL FOREST PRODUCTION
HARDWOOD, 1934 - 1981

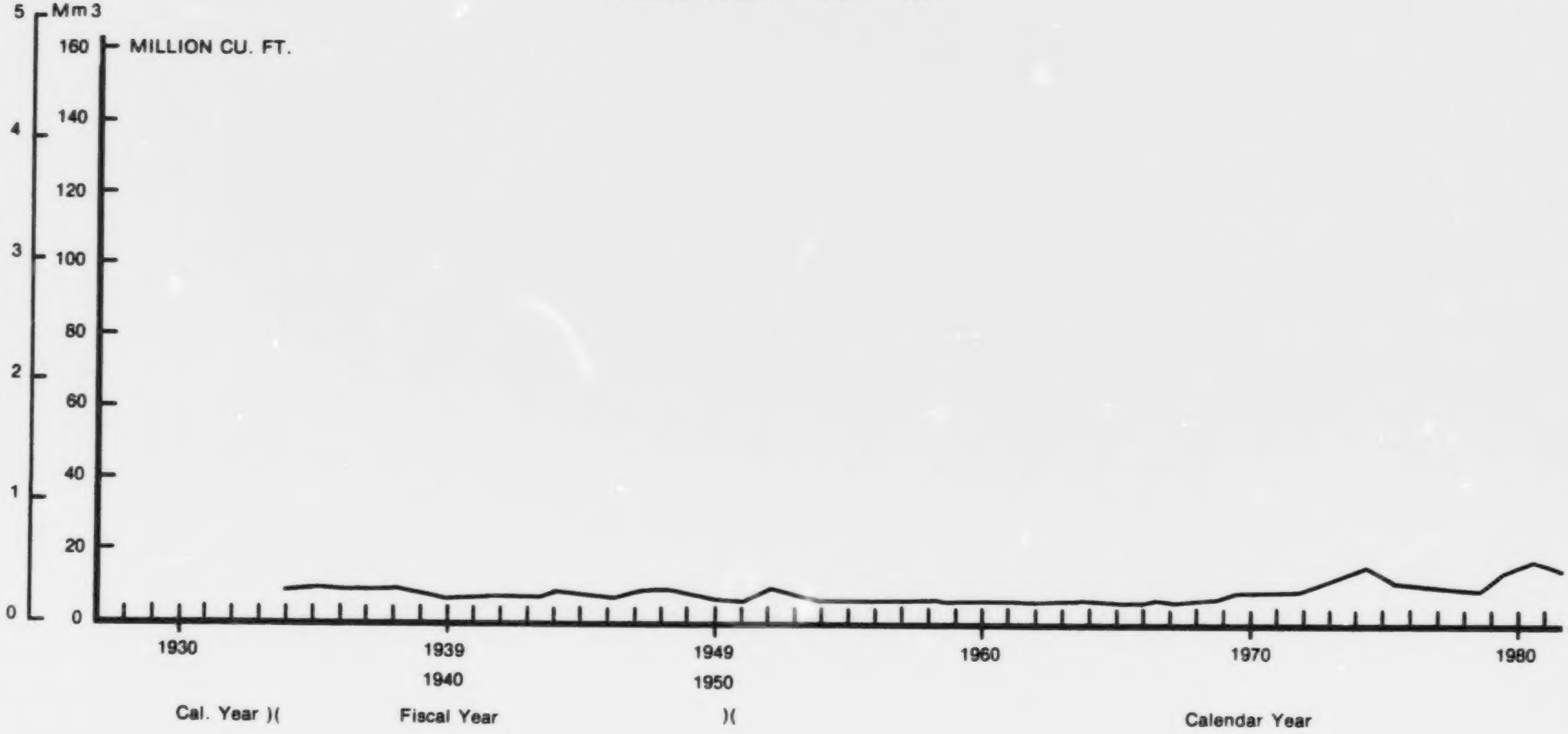
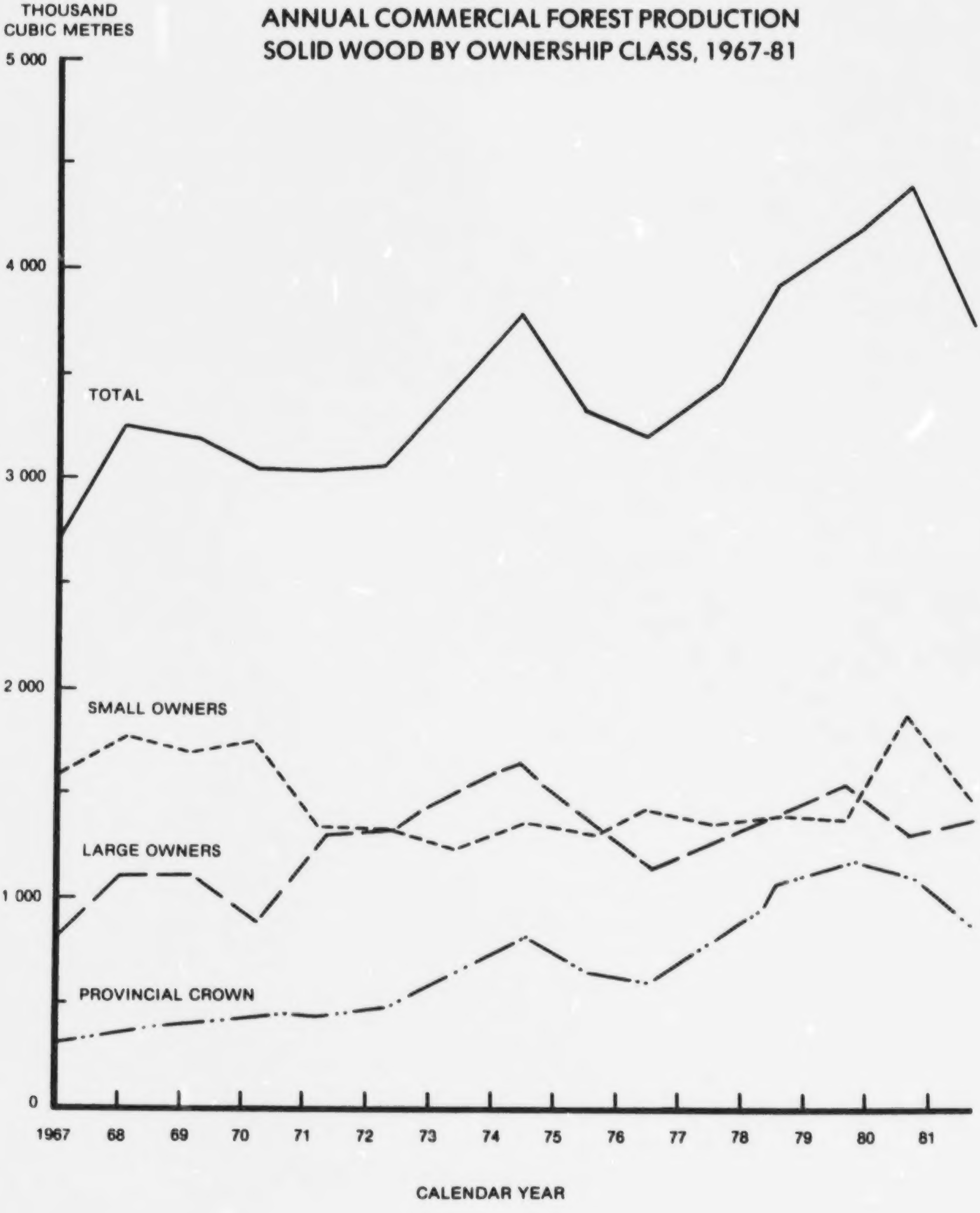


FIG. 30

NOVA SCOTIA
ANNUAL COMMERCIAL FOREST PRODUCTION SOLID WOOD BY OWNERSHIP CLASS, 1967-81



presumably meant that alternate employment was available in many instances and that there was less interest in producing pulpwood on the part of private landowners.

Alternatively, it could be suggested that the anomalous trends in production from the small private ownerships may have resulted from the wood purchasing activities of the major users of roundwood. While the data available do not permit any definitive statements to be made in this regard, it is obvious from Figure 30 that production rose in 1975-76 at a time when markets were weak and pulp and paper mills were shut down for a period by a strike of mill workers. Swings in production could also reflect pricing arrangements for purchase wood, or other variables that we cannot presently quantify.

Looking at these data in absolute terms, we see that the industrial harvest from the small private holdings dropped from a recorded peak of 1 764 000 m^3 (799,000 cords) in 1968 to 1 259 000 m^3 (570,000 cords) in 1973. Production rebounded slightly to approximately 1 350 000 m^3 (610,000 cords) in the mid 1970's and surged to a record high of 1 860 000 m^3 (840,000 cords) in 1980. The drop in production in the early 1970's is explained in part by a decline in exports of approximately 221 000 m^3 (100,000 cords) and a drop in sawlog production of 133 000 m^3 (60,000 cords). On the other hand, the increase in production in the late 1970's coincided with strong markets for pulp, paper and sawn products, further stimulated by the wood salvage/storage project in Cape Breton discussed separately below.

As will also be noted from Figure 30, production from the large private category (greater than 400 hectares or 1,000 acres), which is dominated by two pulp and paper companies, increased significantly during the period under review, closely tracking the trends in total production. Specifically, production increased rather dramatically from a low of 794 000 m^3 (359,000 cords) in 1967 to a high of 1 650 000 m^3 (746,000 cords) in 1974 and declined to 1 300 000 m^3 (589,000 cords) in 1980. These trends were clearly influenced by the establishment of the Scott Maritimes Ltd. mill and a concomitant increase in the production of wood from associated land holdings that had been previously under-utilized. Cyclical swings in market demands, especially in 1974 and again in the late 1970's when industry operated at close capacity, are also in evidence.

It should also be noted that this category of ownership produces over half of the sawlogs in the province. In 1967 sawlog production exceeded pulpwood production. For most of the period since then, sawlogs have ranged between 35% and 40% of the total.

The greatest increase in production during the period under review clearly occurred on Crown lands. Production increased from 296 000 m^3 (134,000 cords) in 1967 to 1 470 000 m^3 (504,000 cords) in 1980. The growth in production resulted from the commitment under the Scott Maritimes Pulp Limited Agreement Act (50,000 cords) and The Nova Scotia Pulp Limited Agreement Act (330,000 cords), and from several smaller commitments for sawlogs discussed in Chapter 3. The wood storage project in Cape Breton further stimulated production in the 1978-81 period. It should also be noted that prior to the late 1960's Crown lands were clearly underutilized.

Relative Share of Production:

While fluctuations in production have been examined in the foregoing, this has not permitted an adequate appreciation of the relative share of total production and any discernible trends in this regard. For example, from time to time references are made to the fact that the harvest from the small private category has dropped from 60% of the total to less than 40%. Some of these statements have been used by the Department of Lands and Forests in justifying certain programs. While usually factually correct when so used, such statements may have the unwanted effect of suggesting a comparable decline in absolute terms on a year-over-year basis. In an attempt to place relative market share in some sort of perspective, the average annual production for the period 1972-1976 has been compared with the 1977-1981 period. The averages used are total wood deliveries exclusive of wood remaining in storage under the wood storage agreement in Cape Breton as of December 31, 1981.

As Figure 31 shows, small private holdings contributed 39% of the harvest in the 1972-76 period and 40% of the larger harvest in the 1977-81 period. Thus, on this basis, the average harvest in this category increased in both absolute and relative terms. This suggests that the small private ownerships have more than held their own over the last few years - even though wood consumption was at record levels.

Nevertheless, it is important to note here that while the average annual harvest from the small private category during the 1967-71 period was approximately 166 000 m^3 (75,000 cords) higher than for the 1972-76 period, the former represented 60% of a much smaller total harvest. On the other hand, the average annual harvest for the 1977-81 period was marginally higher (by approximately 22 000 m^3 or 10,000 cords) than for the 1967-71 period, and over 177 000 m^3 (80,000 cords) greater than in the 1972-76 period. This suggests that the small private category has improved its market position in both relative and absolute terms.

A similar comparison has been made for the sawlog harvest and is presented in Figure 32. As noted previously, the sawlog production curve has been relatively flat for the past decade or more. The small private share of a slightly larger harvest in the most recent 5 year period has declined marginally to 39% from 40% in the 1972-76 period. On the other hand, the large private share declined from 54% to 50%, while the Crown land share increased from 6% to 11%.

The comparison for the pulpwood harvest (Figure 33) yields similar results. The small private share of a larger average harvest increased from 39% to 40%; the large private share declined by 4 % to 33%, and the Crown land share increased by 3% to 27% in 1977-81.

As discussed in Chapter 3, it is assumed that a significant portion of forest land in the small private category has been effectively removed from production due to incompatible objectives of owners and other barriers associated with private ownership. For these reasons it was suggested in Chapter 3 that it is realistic to assume that

FIG. 31

COMPARATIVE
FIVE YEAR AVERAGE TOTAL HARVEST BY OWNERSHIP

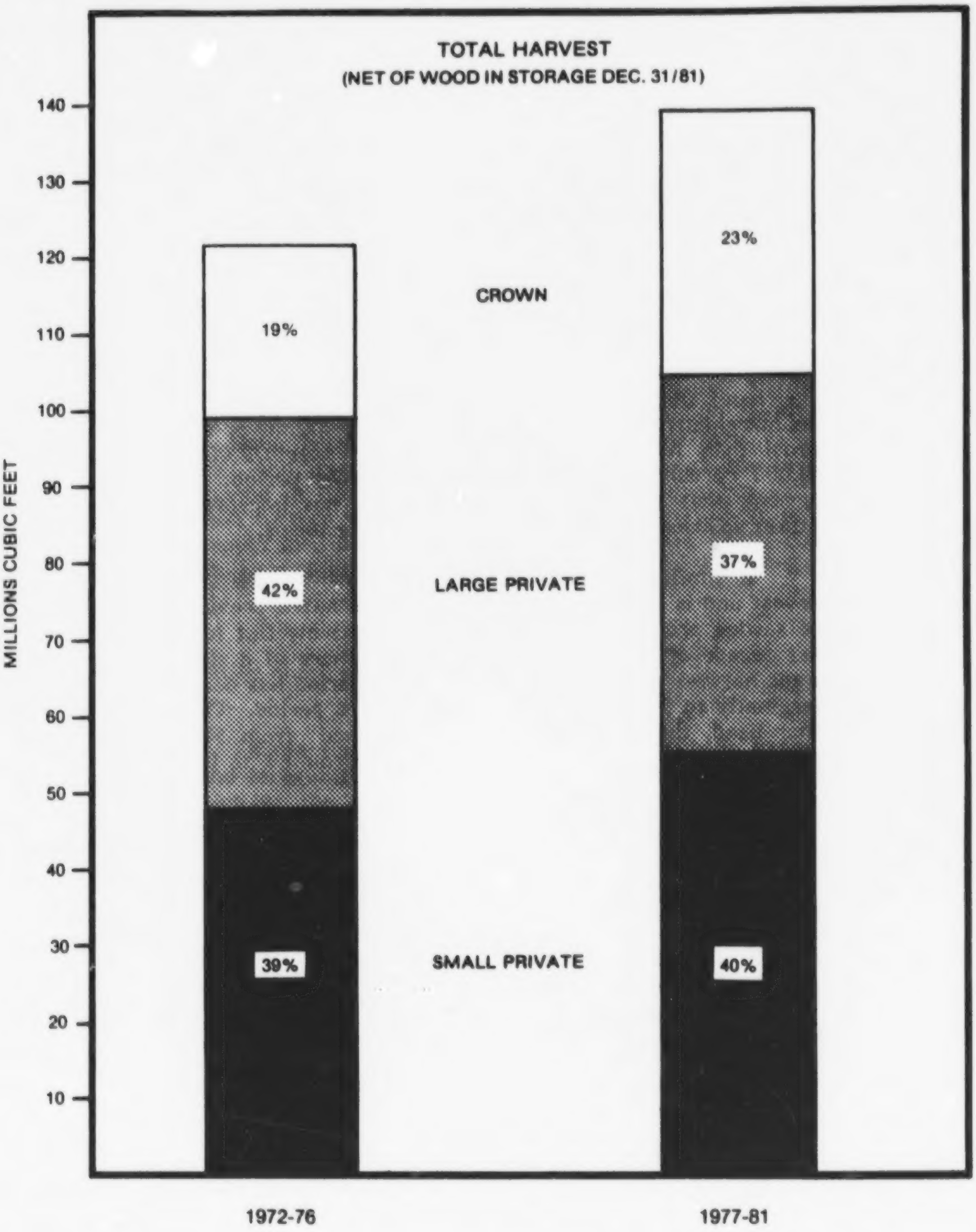


FIG. 32

COMPARATIVE
FIVE YEAR AVERAGE SAWLOG HARVEST BY OWNERSHIP

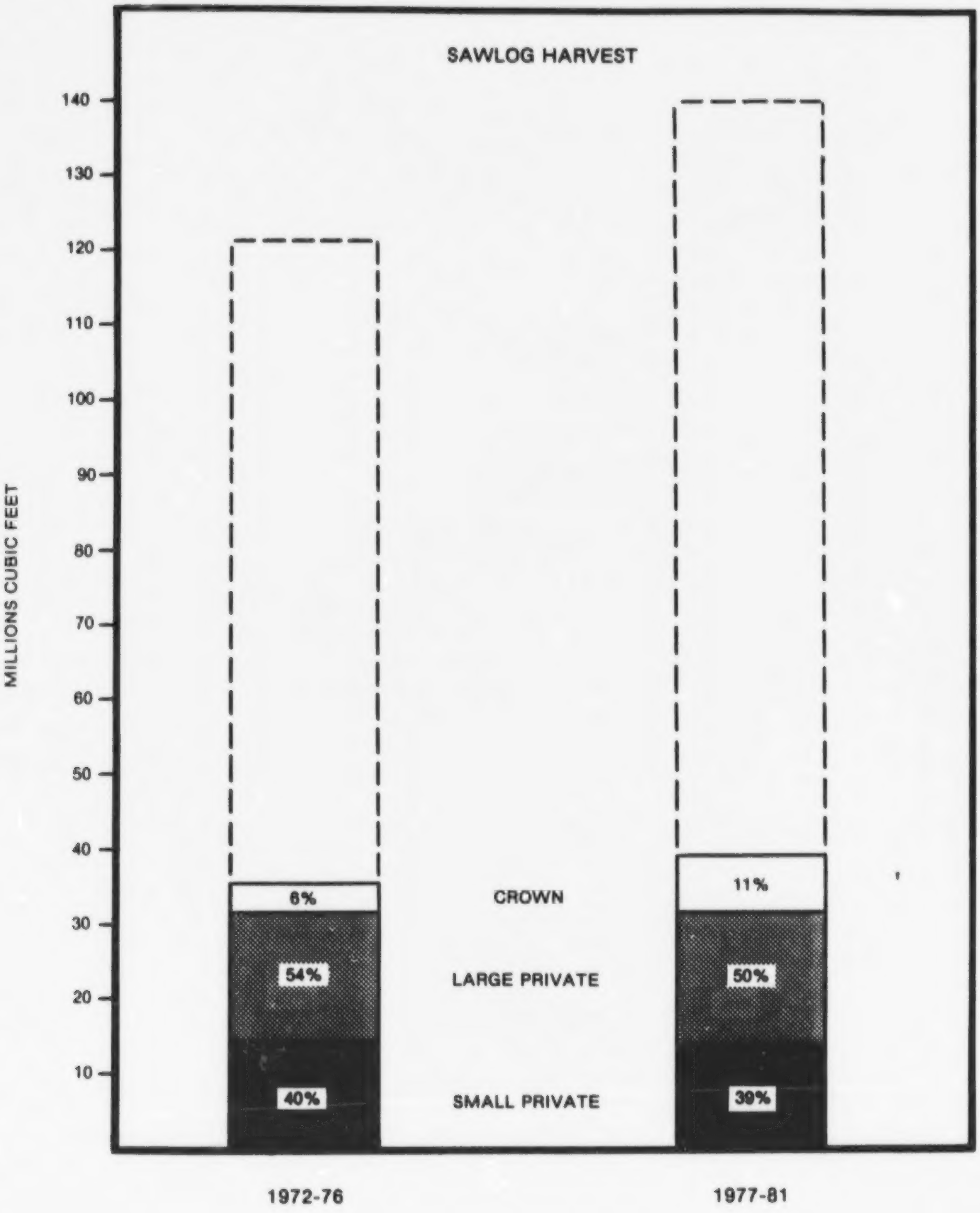
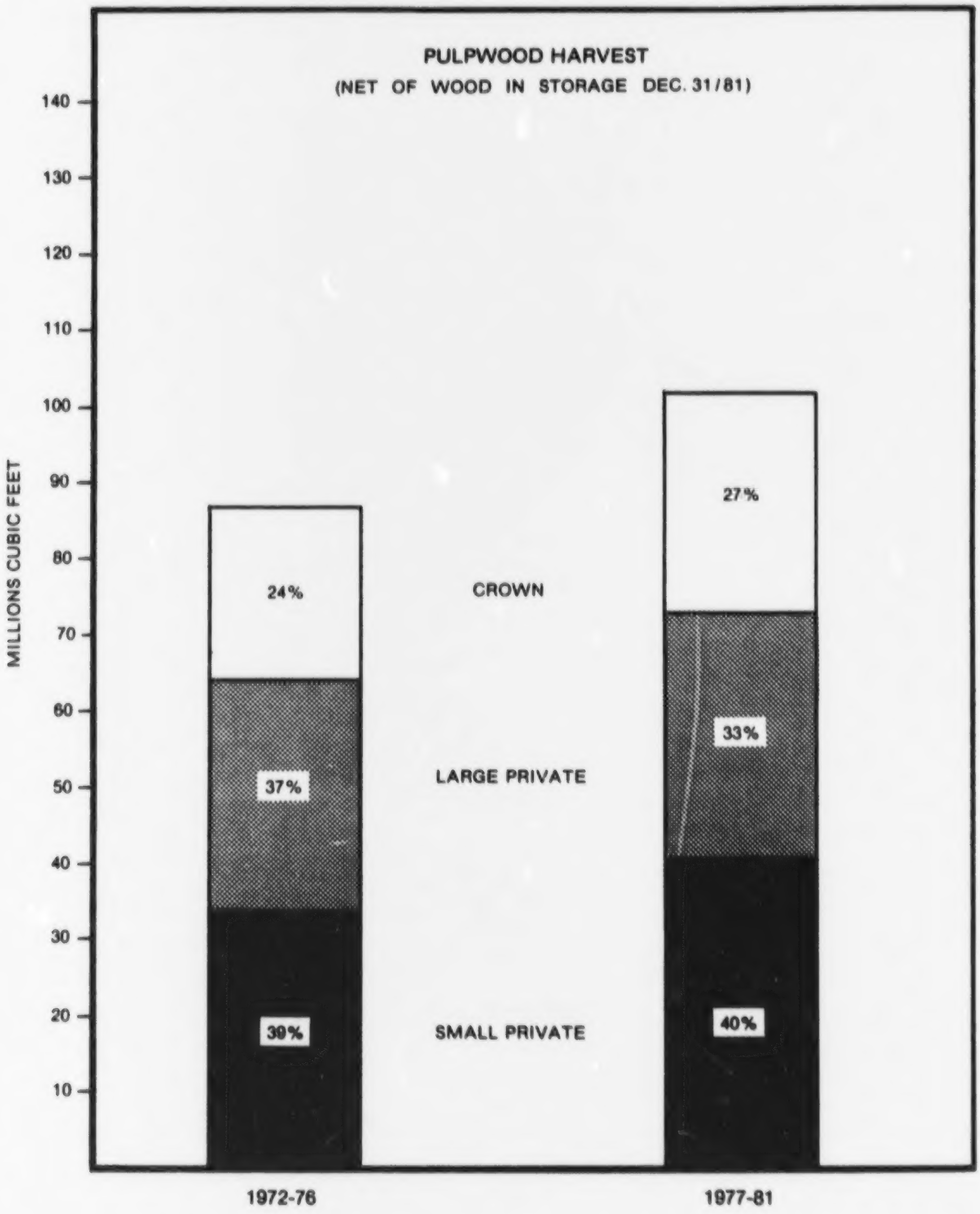


FIG. 33

COMPARATIVE
FIVE YEAR AVERAGE PULPWOOD HARVEST BY OWNERSHIP



some 60% of the productive forest land in the small private category will be available for harvesting over the next 40 years or so. In other words, the land base from which the small private harvest will be taken over the next 40 or more years is assumed to be approximately 1 300 000 ha (3.2 million acres) rather than 2 100 000 ha (5.2 million acres). Given this assumption, a comparison of harvest share and available land has been attempted (Figure 34).

As figure 34 indicates, 52% of the productive forest land in the province is owned by small private owners, 21% by large private, 24% is owned by the province and 3% is federal Crown. When only the assumed available land is included, the small private is reduced to 40%, large private increases to 28% and Provincial Crown becomes 32%. When this adjusted land base is compared to the actual share of the harvest for the most recent 5 year period it is apparent that the small private share (40%) compares favourably with the presumed availability of land in that ownership category. The contribution from the large private ownerships exceeds the assumed percentage of productive forest land, while the contribution by Provincial Crown is well below the adjusted share of productive land.

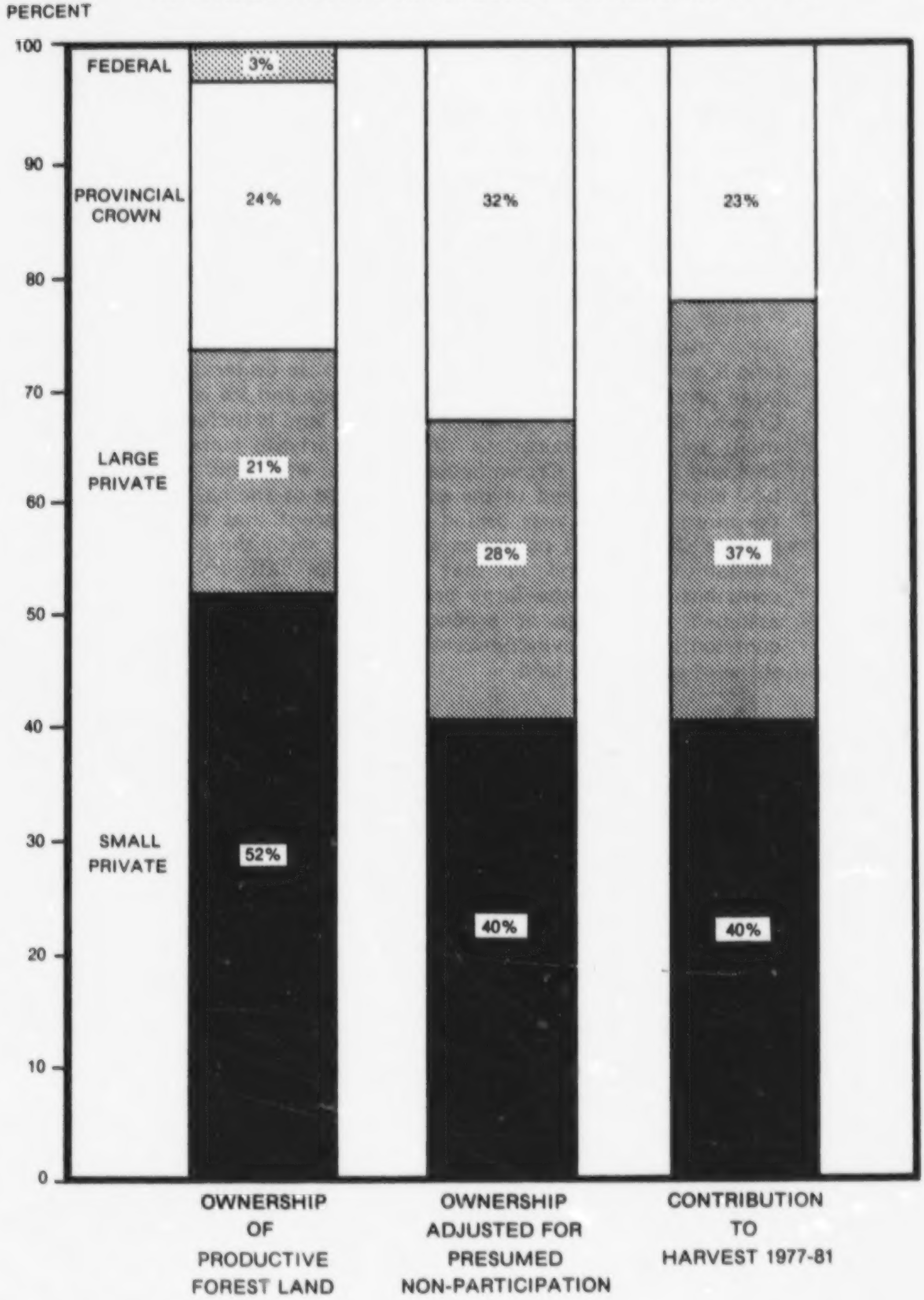
Wood Salvage/Storage Project

In 1977 it was generally conceded that a very considerable volume of softwoods in Cape Breton was likely to be lost after several years of severe defoliation by the spruce budworm. At the same time, pulp and paper markets were not particularly buoyant, while pulpwood inventories at roadside and in mill yards were relatively high. As a result, market prospects for the small private producers in the seven eastern counties were bleak, and promised to become more so as concern mounted over budworm losses.

A Task Force on Wood Allocation and Forest Management was appointed to address this and other problems associated with the spruce budworm. It made an interim recommendation to the Minister of Land and Forests in early

FIG. 34

CONTRIBUTION TO HARVEST BY OWNERSHIP, 1977-81



1977 that 110 000 m^3 (50,000 cords) of softwood pulpwood be placed in temporary storage on the Cape Breton Highlands to permit Nova Scotia Forest Industries to increase purchases from private suppliers by a comparable volume. This wood was to be stored during the 1977 harvesting season and removed from storage "as soon as possible". The recommendation was accepted and the wood was placed in storage with funding assistance from the Province. Nova Scotia Forest Industries increased purchase wood quotas to the agreed-upon figure of 309 000 m^3 (140,000 cords) in 1977.

During 1977 a consultant's study on storage alternatives for larger volumes of spruce budworm-killed wood was completed with funding provided under the Subsidiary Agreement for Forestry. This study confirmed that the storage of larger volumes of such wood was technically feasible. The final report of the Task Force contained a recommendation that 1 440 000 m^3 (650,000 cords) of salvaged wood be placed in storage in Cape Breton.

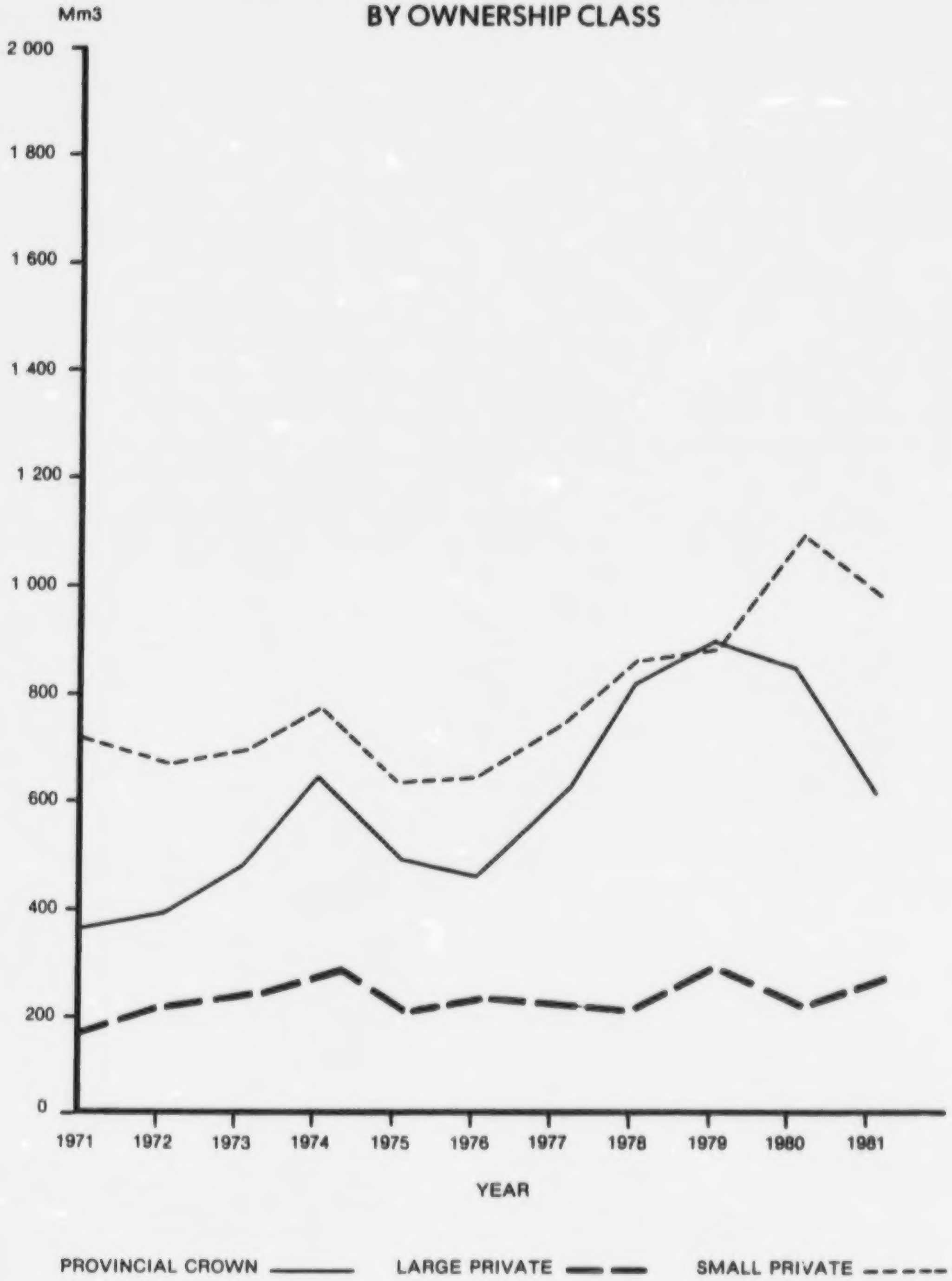
In July 1978 the Province entered into an agreement with Canada in the form of an amendment to the Subsidiary Agreement for Forestry to jointly fund the storage of 1 190 000 m^3 (540,000 cords) of salvaged wood. The objective was to obtain some economic benefit from additional volumes of high risk wood without jeopardizing small private suppliers. In the later connection it was agreed that if small private production could be maintained at the 1974 level this objective would have been met.

The project has now been executed essentially as originally envisioned. By December 31, 1981, a total of 1 100 000 m^3 (500,000 cords) had been placed in storage. Nevertheless, it has been alleged from time to time that this program was not implemented as originally envisioned and that it has had an unfavourable impact on small private producers. In an attempt to place the impact on wood flows in perspective, harvesting by ownership class in the 7 eastern counties is presented in Figure 35.

As Figure 35 indicates, the production on Crown lands increased dramatically with the initiation of storage operations. However, the figure also shows that production on small private ownerships also increased to a level well above

FIG. 35

COMMERCIAL FOREST PRODUCTION, SEVEN EASTERN COUNTIES 1971 TO 1981, BY OWNERSHIP CLASS



the presumed desirable level of 1974. In fact, it is evident that the storage program had a much more favorable impact on the small private producers than that envisioned when the program was initiated.

It should also be noted here that the average annual Crown land harvest in the 7 eastern counties has been significantly less than the 729 000 m^3 (330,000 cords) committed under the Nova Scotia Pulp Ltd. Agreement Act. During the period 1974-1981 the Crown land harvest utilized by NSP/NSFI averaged 526 000 m^3 (238,000 cords) or approximately 45% of total wood requirements of that company.

The total harvest in the 7 eastern counties also includes significant volumes of wood for other industries, including the Scott Maritimes Limited mill, the export pulpwood market and local sawmills. On average, the Crown land harvest over the past 8 years - including all salvage and storage--represents between 38% and 39% of industrial harvesting in the 7 eastern counties. When the wood remaining in storage at December 31/81 is deducted, the average Crown land harvest drops to around 33% of the total. This is in line with the proportion of productive forest land controlled by the Crown in that region of the province.

There is no indication that in future the storage program will adversely effect the small private producers. While all remaining stored wood is expected to be utilized by the end of 1984, the total wood requirement from Crown land (harvesting plus deliveries from the provincial stockpile) in 1983 is expected to be around 424 000 m^3 (192,000 cords) - less than 45% of anticipated wood requirements of Nova Scotia Forest Industries.

The salvage/storage project permitted a much larger harvest than would otherwise have been possible. While the storage operations took place on Crown land, largely for security reasons, the greatest impact was realized by the small private producers. They were able to dispose of much larger volumes of wood than if the salvaged wood had gone straight to the mill. It is reasonable to suggest that without the wood storage program the production on small private ownerships during 1978-81 would have been comparable to 1974 levels, at best.

Other Removals

Total removals from the forest include the associated cull and waste, loss during logging, fuelwood and other personal use removals, as well as fire, insect and disease losses. This category also includes the annual Christmas tree harvest of upwards of 1.5 million trees. The fuelwood harvest deserves special mention.

Unlike other removals such as the Christmas tree harvest, the fuelwood harvest does have the potential of competing directly for wood with other industrial uses. While reliable data are not available, it is estimated that the fuelwood harvest now exceeds 441 000 m^3 (200,000 cords) annually. Stimulated by recent increases in energy costs and federal off-oil incentive grants, fuelwood demand continues to grow at a fairly rapid rate. It has also been estimated that up to 100 000 m^3 (45,000 cords) of softwood may also be utilized as fuelwood. However, much of this volume is believed to be in the form of slabwood from sawmills, and therefore accounted for elsewhere as part of the industrial harvest.

However, it is impossible to determine what the actual harvest may be or what trends are developing, since no mechanism exists to monitor the fuelwood harvest. In the absence of such data it is impossible to estimate the full potential repercussions or to develop forest management goals for the hardwood component. It is not inconceivable that the fuelwood harvest could well have an adverse impact on future industrial activity.

It is clearly desirable that the Province initiate a fuelwood harvest monitoring system. This would inevitably involve a user survey of households. It may well be beyond the expertise and mandate of the Department of Lands and Forests, but the need is there.

6

Insects & Diseases

Summary

In the past 20 years the annual industrial harvest has increased by 58% to an average of 3 910 000 m^3 (1.77 million cords) in the 1977-81 period. Over 90% of the industrial harvest is in the softwood species. On this basis it is evident that existing industry requires a minimum of 3 300 000 m^3 (1.5 million cords) of softwood and 442 000 m^3 (200,000 cords) of hardwood annually to operate at close to capacity. The forests of Nova Scotia now yield an annual industrial harvest of approximately 1.1 m^3/ha, ranking third amongst the provinces.

Hardwoods have never been heavily utilized. Their largest recorded harvest occurred in 1980, when 523 000 m^3 (230,000 cords) were used, representing a high of 12% of the overall harvest.

The harvest on the small private ownerships declined in the 1969-71 period but has remained fairly constant since then. Over the past decade it has represented approximately 40% of the total harvest, down from 60% of a much smaller harvest in the 1967-71 period. Production from the large private ownerships has increased significantly since 1967, in line with increased industrial capacity. The Crown land harvest has increased to 23% of the total, reflecting commitments made in conjunction with new and/or expanded industries.

If we compare the relative market share of each of the major ownership categories, it is noted that the small private share is in line with presumed availability, the large private share exceeds the proportion of land owned, and the Crown land share is less.

Concerning the effect of the wood storage program in Cape Breton, it is noted that the impact on the small private ownerships in the 7 eastern counties has been even more favourable than anticipated. It is also observed that the harvest on Crown land has been significantly less than the commitment under the Nova Scotia Pulp Limited Agreement Act.

In future, other removals, particularly fuelwood, may compete with industrial users for an increasingly scarce resource. At present there is no mechanism in place to monitor the fuelwood harvest, although such data are required to accurately forecast the availability of the resource. Therefore, it is suggested that some means of regularly gathering fuelwood harvest data be developed.

6. INSECTS AND DISEASES

In Chapter 1 reference is made to the impact of insects and diseases on the forest resources of the province. White pine blister rust, beech bark disease, balsam woolly aphid and the spruce budworm were mentioned specifically. To these could be added a veritable host of pests that have had varying impacts on the forests over the years. However, there is little doubt that the spruce budworm poses by far the most serious problem of this type. While the impact of this insect is addressed elsewhere in this report, especially in Chapter 7, the problem warrants separate mention here.

Spruce Budworm

The spruce budworm is one of the most devastating insect pests in North America. This native insect is Canada's and Nova Scotia's number one forest pest problem. Recorded outbreaks of spruce budworm in Nova Scotia date back to 1846. Our current infestation commenced with a flight of moths into Cumberland County in 1968 and into Inverness County in 1973. These adults bolstered local populations of spruce budworm adults to form the basis of the current epidemic, which has resulted in widespread defoliation and catastrophic losses of mechantable stands (Table 6, and Figures 36 to 38). Recent estimates put the loss of spruce and fir on Cape Breton Island at 21 500 000 m^3 (9.5 million cords), or roughly 50% of the total original softwood volume on the Island prior to the infestation. In terms of number of trees, the Canadian Forestry Service (CFS) has estimated the cumulative mortality of merchantable balsam fir on Cape Breton Island to be 67% on the Highlands and 88% on the Lowlands (Figure 39).

TABLE 6

Annual gross area of visible defoliation of spruce (*Picea* spp.) and balsam fir (*Abies balsamea*) by larvae of spruce budworm (*Choristoneura fumiferana* (Clemens, 1865)) in Nova Scotia from 1969 to 1982.

Year	Annual gross area of visible defoliation (x 10 000 ha)				
	Light	Variable	Moderate	Severe	Total
1969[1]	NR[3]	NR	NR	1.0	1.0
1969[2]	NR	NR	3.0	0.5	3.5
1970	0.2	NR	3.1	0.3	3.6
1971	4.6	NR	2.1	16.1	22.8
1972	1.6	NR	2.5	11.5	15.2
1973	NR	NR	3.6	5.3	8.9
1974	6.5	NR	21.8	10.0	38.3
1975	8.0	NR	16.8	71.0	95.8
1976	11.5	NR	14.0	69.0	94.5
1977	11.5	NR	4.6	85.0	101.1
1978	1.4	20.3	10.2	45.2	77.1
1979	22.1	33.9	16.8	35.9	108.7
1980	10.5	55.9	22.4	49.2	138.0
1981	13.3	NR	15.6	41.1	70.0
1982	3.7	NR	12.5	5.0	21.2

[1] Local population - Port Hood area, Cape Breton.

[2] Immigrant population - Mainland.

[3] NR means none recorded.

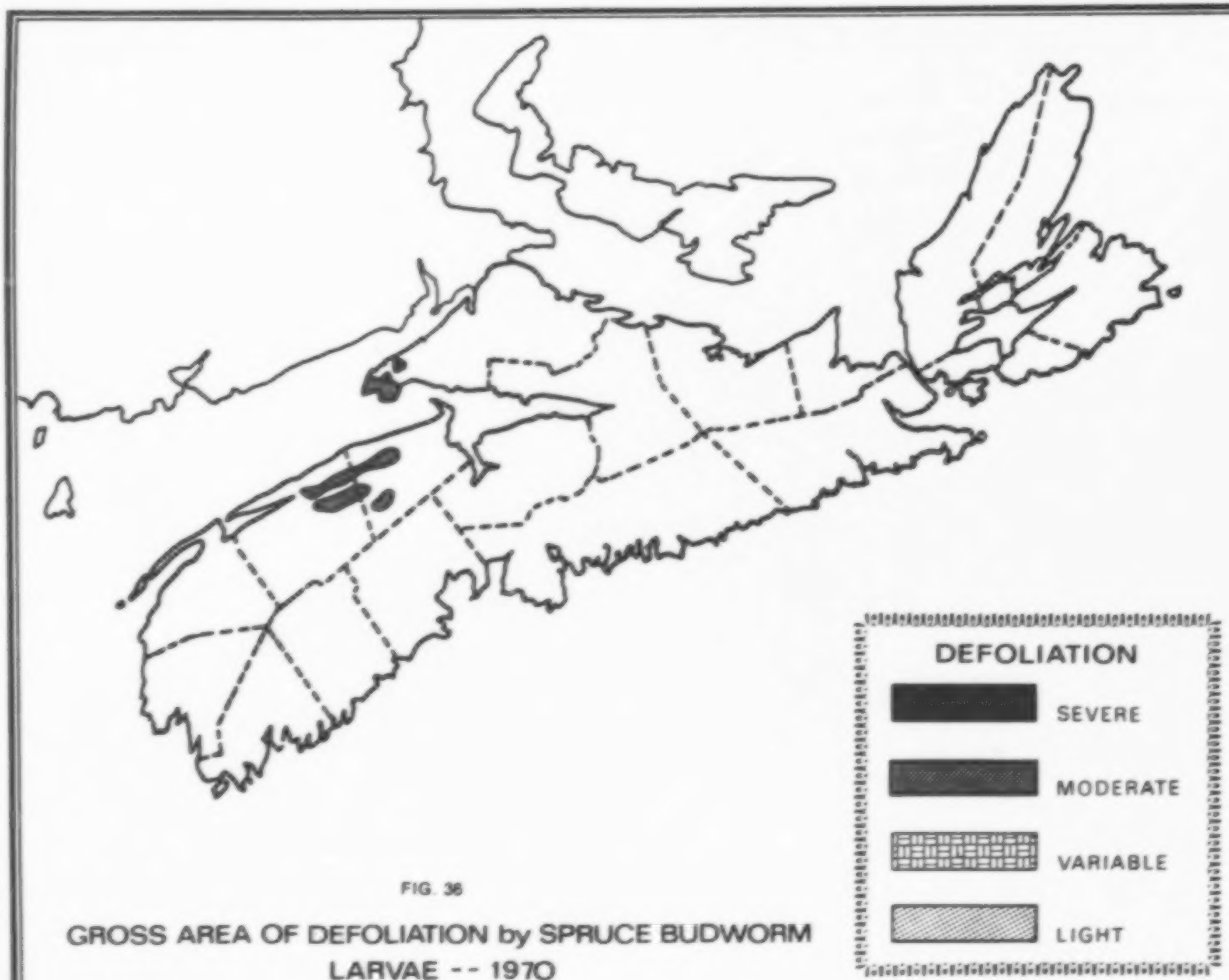

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 36

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM
LARVAE -- 1970

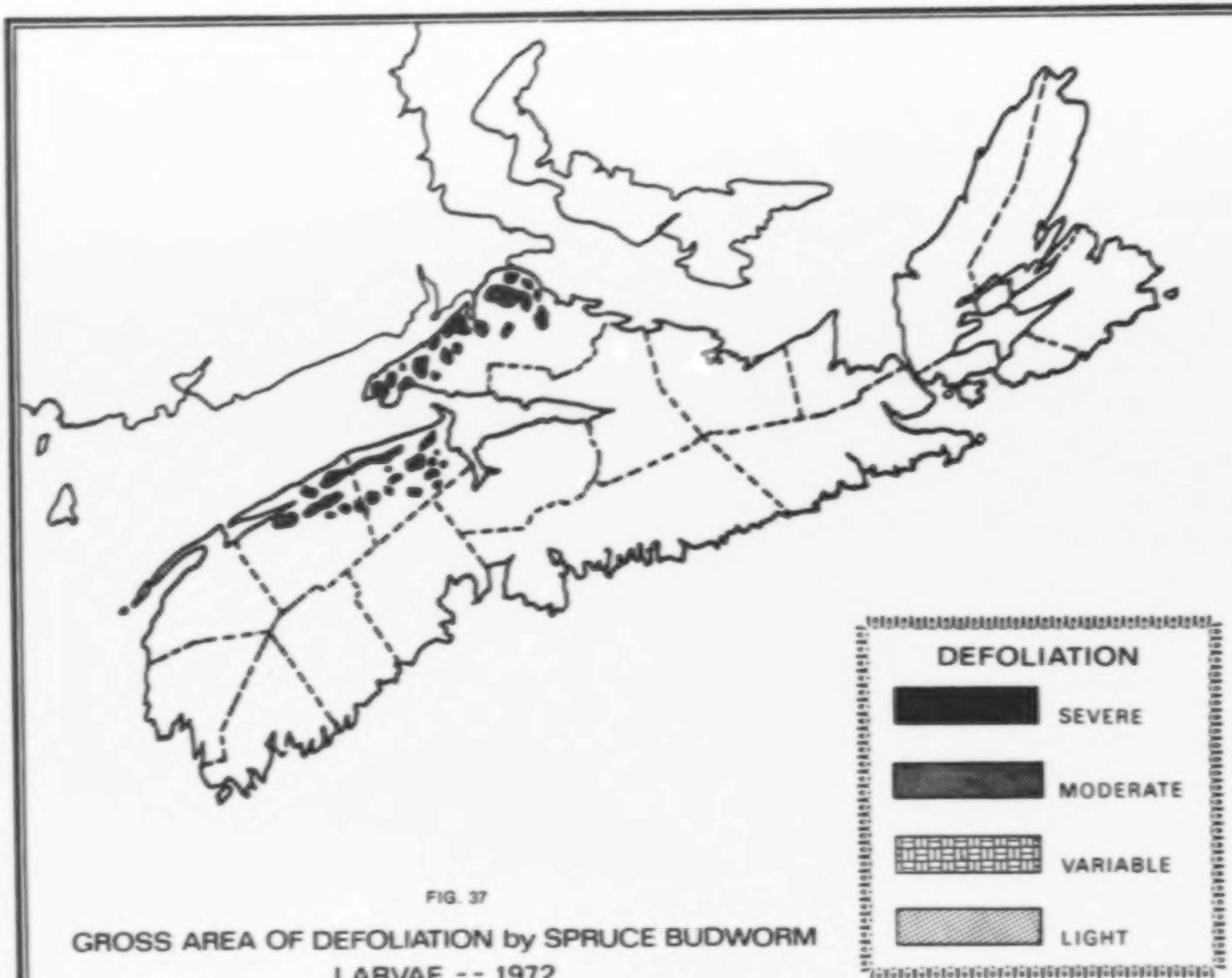
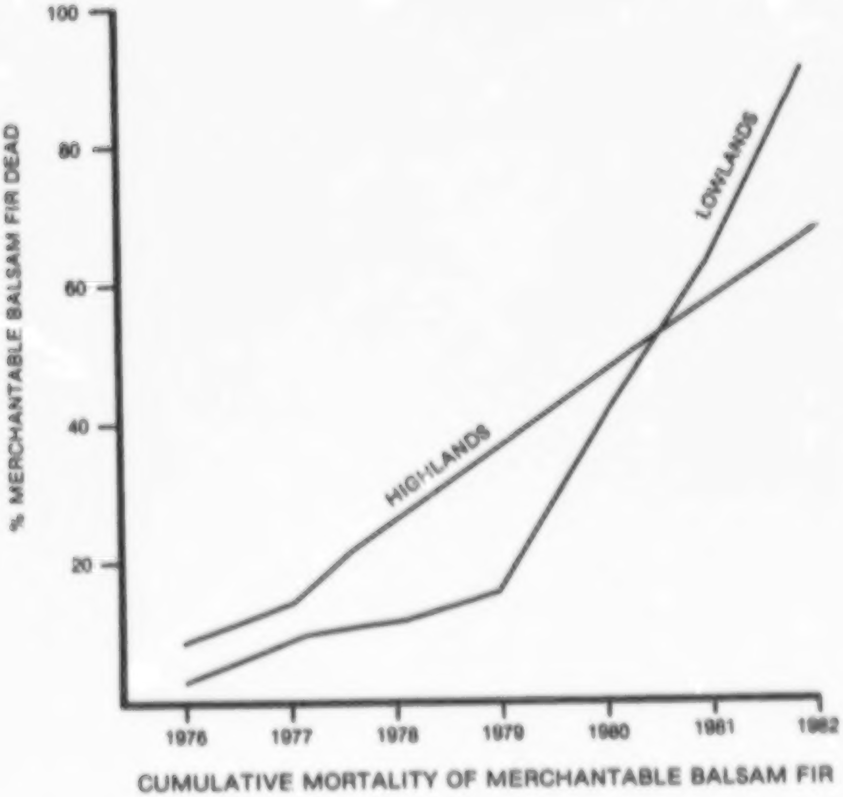

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 37

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1972

FIG. 38

CUMULATIVE MORTALITY OF MERCHANTABLE BALSAM FIR ON CAPE BRETON ISLAND



SOURCE: CANADIAN FORESTRY SERVICE, MARITIME FOREST RESEARCH CENTRE, TECHNICAL NOTE NUMBER 65, OCTOBER '82

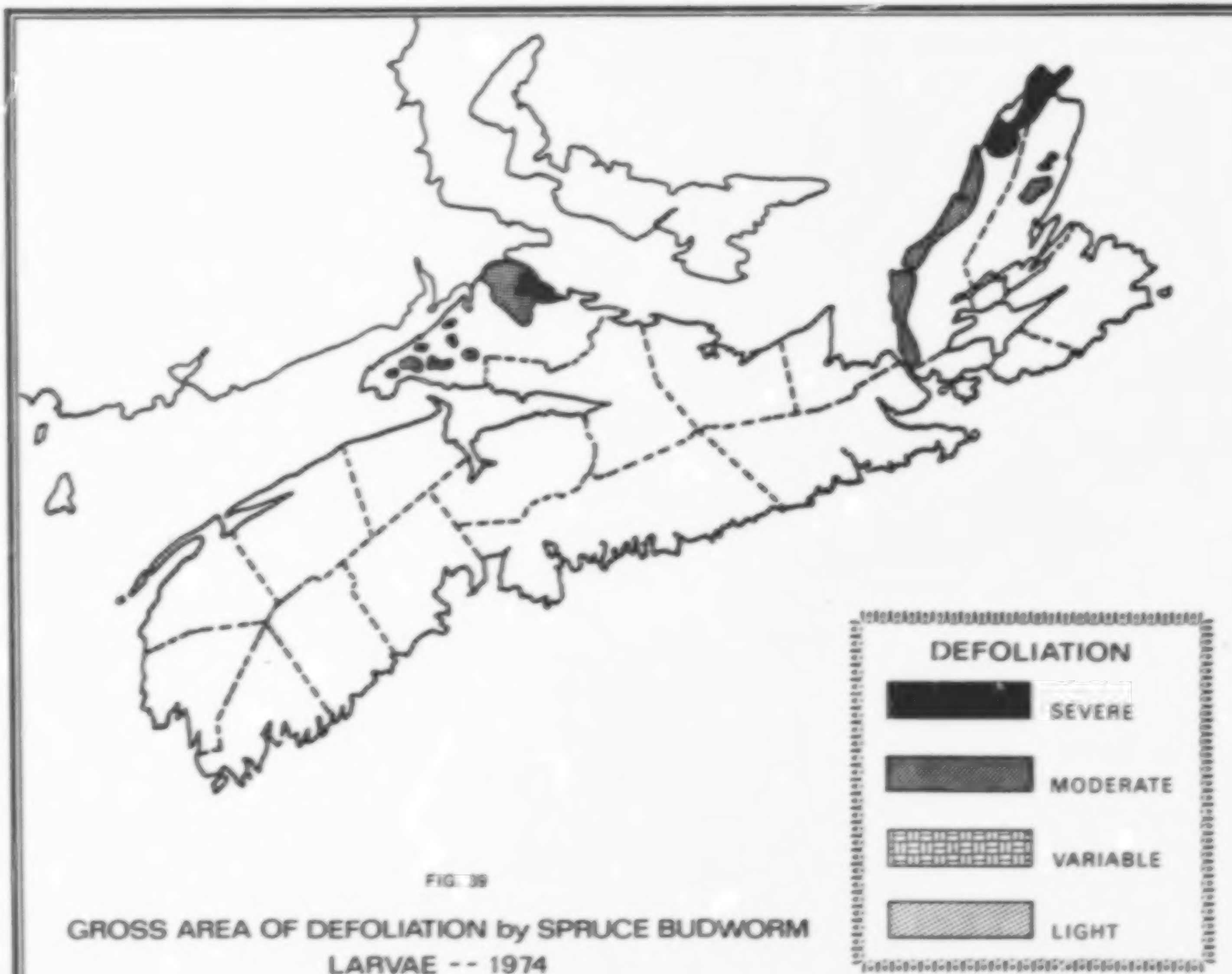

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 39

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1974

Substantial losses of spruce and fir have also occurred in Cumberland County. Studies of the Department's permanent sample plots there indicate that the rate of mortality has more than doubled since the onset of significant mortality in 1974. Meanwhile, the growth of the remaining living trees has been reduced by 25%. The cumulative effect of this one-two punch--mortality plus reduced rate of growth--has been an overall loss of 3 300 000 m^3 (1.5 million cords) of merchantable spruce and fir during the period 1974 to 1982. Adding this loss to that on Cape Breton Island brings the total loss to date in these 2 areas to roughly 24 000 000 m^3 (11.0 million cords). This amounts to almost 13% of the total softwood resource in the province.

The amount of softwood lost to the budworm in the remaining portions of the province under attack by the budworm is at present unknown. Unfortunately, even this tremendous reduction in the growing stock (24 000 000 m^3) may be an underestimate, because it does not include the living merchantable softwood and hardwood volume rendered uneconomic to harvest because it occurs in stands which now have a high component of dead or otherwise unmerchantable or unsalvageable wood. Moreover, much of the remaining living spruce and fir have been weakened by the budworm, predisposing them to extensive damage by winds and increasing populations of secondary insects and diseases such as bark beetles, weevils and root rots.

On the other hand, it must also be noted that these losses are gross merchantable volumes, occurring on private lands as well as on Crown. Therefore, any comparison with harvest volumes must take account of deductions for waste and cull and other losses in harvesting, as well as deductions for ownership barriers discussed elsewhere in this report.

A salvage program was initiated in Cape Breton in 1977. It was accelerated in 1978, when the Subsidiary Agreement for Forestry was amended, providing for the salvage and storage of approximately 1 104 000 m^3 (500,000 cords). An estimated additional 2 300 000 m^3 (1,000,000 cords) was salvaged and forwarded directly to the mills. Salvage has also been undertaken in Cumberland County by industry and landowners. However, as in Cape Breton, the opportunity to use large volumes is limited by industrial capacity and by the unsuitability of such wood for traditional export markets. In view of the likelihood of future shortages of softwood, export markets should be considered only when all possibilities for domestic use have been exhausted.

In retrospect, the spruce budworm infestation was not viewed with alarm until 1976, when N.S.F.I., the licence holder for most of the Crown land in eastern Nova Scotia, applied for a permit to spray 40 000 ha (100,000 acres) on Cape Breton Island. The Province decided not to permit chemical spraying. The decision was heavily influenced by the work of Doctor Crocker et al. at Dalhousie University, and by the alleged link with the children's disease Reye's Syndrome.

The infestation intensified, and N.F.S.I. again requested spraying. In February 1977, the Province again decided not to permit the use of chemcal insecticides, once more citing concern for human health and the alleged link with Reye's Syndrome. In conjunction with this decision, the cabinet authorized the Minister of Lands and Forests to appoint a Task Force on Wood Allocation and Forest Management to examine the problem. The Task Force was comprised of senior officals from federal and provincial governments, industry, woodlot owners and labor.

In February, 1978, the Task Force delivered its report to the Minister. The report included a recommendation for foliage protection. Nevertheless, the Cabinet remained steadfast in its decision not to permit chemical spraying. During 1978, the Province and the Federal government negotiated a wood salvage/storage agreement in keeping with a recommendation of the Task Force, utilizing Canada Works funds. Under this agreement, commencing in 1978, wood was stockpiled with the objective of storing up to 540,000 cords by the end of 1981. This project is discussed in greater detail in Chapter 5.

In early 1979 the Province decided to initiate operational trials using the biological insecticide **Bacillus thuringiensis kurstaki** (B.t.k.). During the spring of 1979 some 6 000 ha (15,000 acres) of the then more than 1 000 000 ha (2,500,000 acres) of spruce budworm infested forests were treated with B.t.k. The results were favorable.

By 1980, the infestation had reached a peak. It covered an area equivalent to about a third of the forested land in the province (Figures 40 to 42). In both 1980 and 1981 the Province decided to expand the B.t.k. program, bringing the total area treated in the latter year to 30,770 hectares (76,000 acres). Populations began to drop rapidly in 1981 and in 1982 the area of infestation was mapped at 210,200 ha (519,000 acres) (Figure 43). The rather dramatic drop in populations in 1982 is attributed in large part to the significant loss of foliage and hence lack of food supply, especially on Cape Breton Island. The B.t.k. program was continued in 1982 but on a reduced acreage due to declining populations.

A 1981 survey of the areas treated with B.t.k. on the Cape Breton Highlands indicated that the average survival of softwood was 73%. For comparison purposes, a survey conducted by the CFS in the same year indicated that the average survival of spruce and fir in the unsprayed forests of Cape Breton was only 22%.

It is important to note that, by the time the decision was made to use B.t.k. on an operational basis, the infestation over much of Cape Breton was so intense that most of the area infested could no longer be protected by that means. In other words, by 1979/80 the pattern of much of the mortality was more or less irrevocably established. Thus, while results with B.t.k. have been relatively favourable, protective measures were implemented too late to prevent the catastrophic losses now being enumerated. On remaining areas B.t.k. appears to afford satisfactory protection.

Spruce Bark Beetle

Much of the forest blown down in the windstorms of 1974, '75 and '76 could not be salvaged and have since acted as breeding gardens for bark beetles. These insects have spread to nearby budworm-weakened stands and are now causing widespread mortality. According to a recent survey

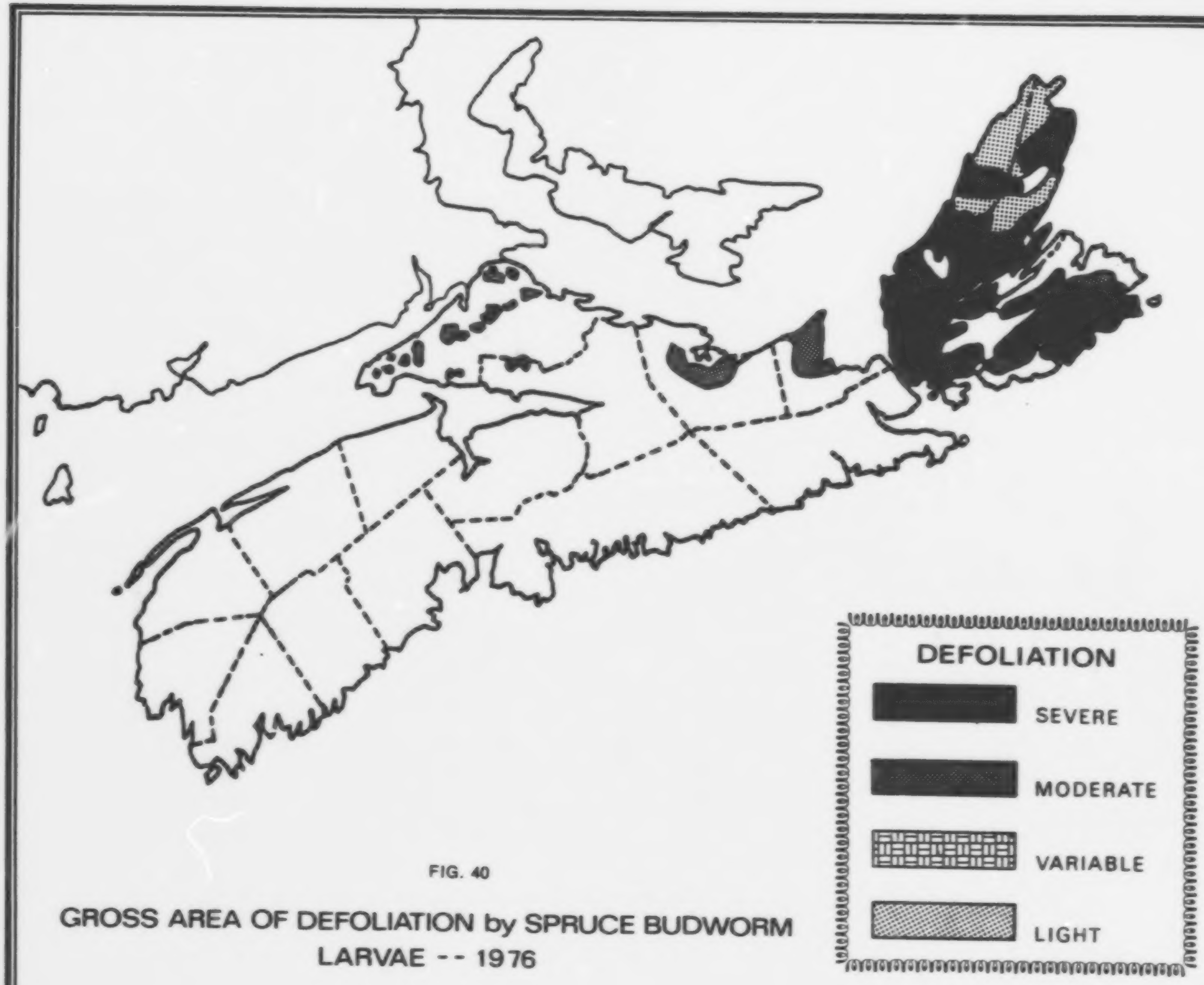

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 40

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1976

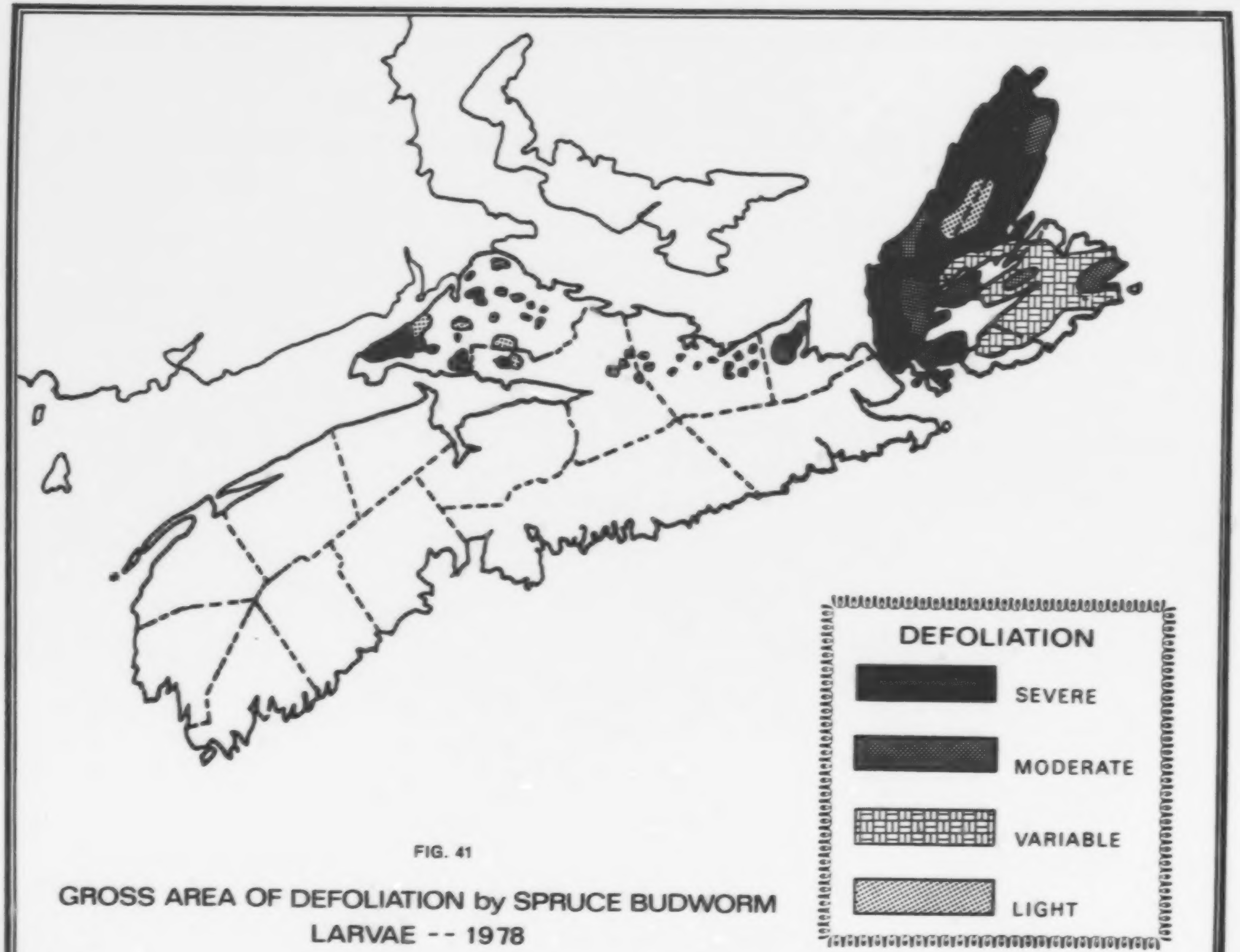

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 41

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1978

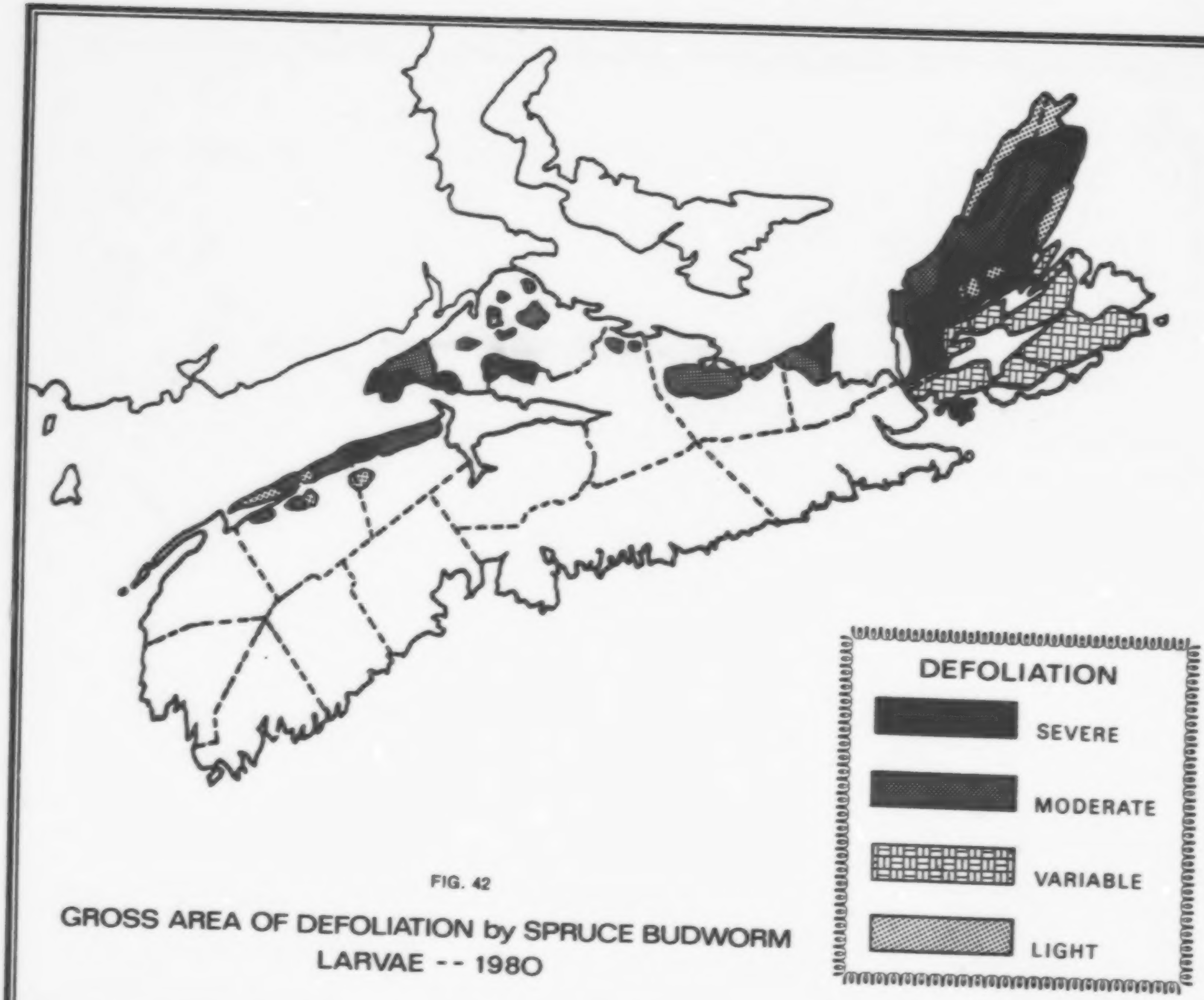

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 42

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1980

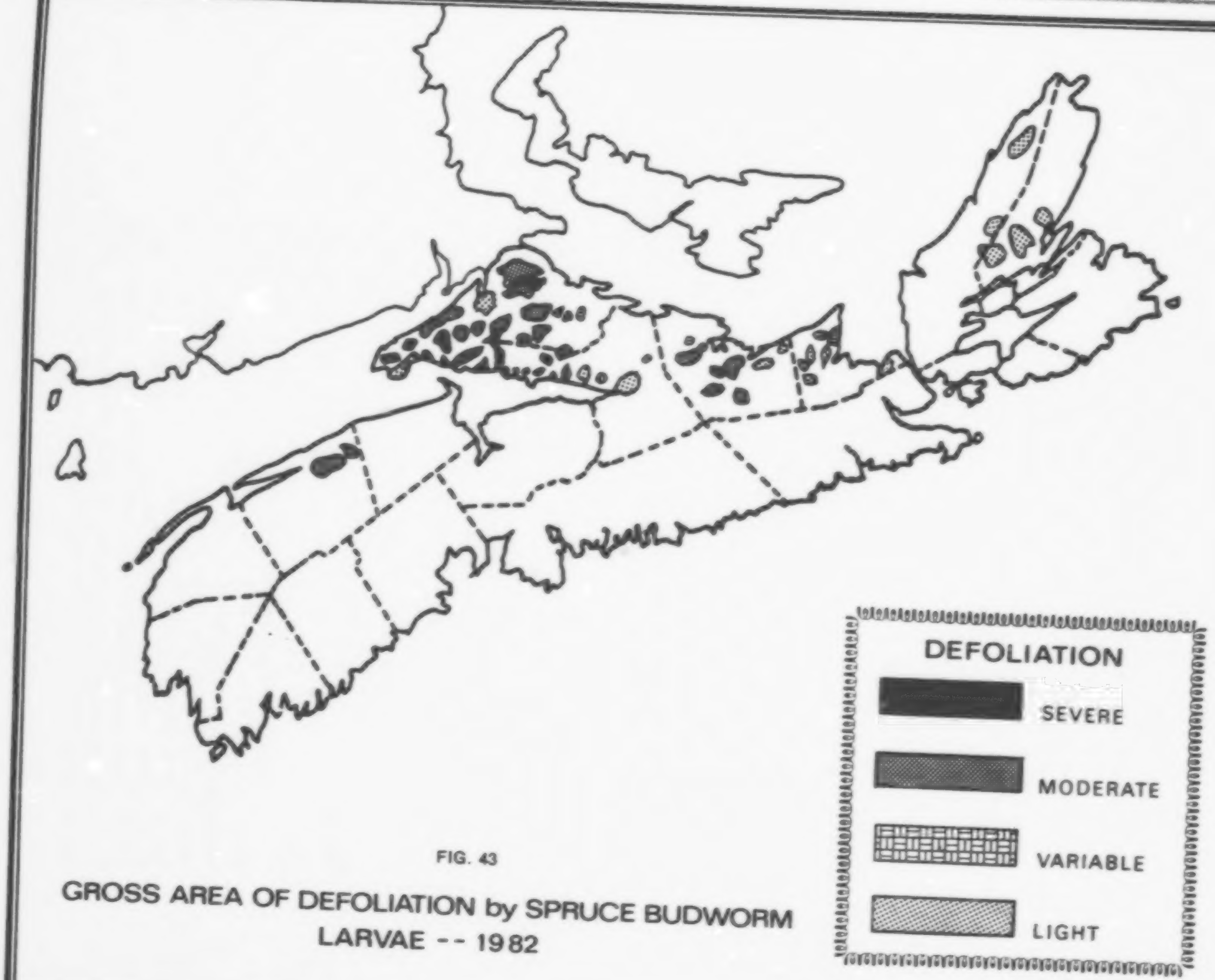

DEFOLIATION
SEVERE
MODERATE
VARIABLE
LIGHT

FIG. 43

GROSS AREA OF DEFOLIATION by SPRUCE BUDWORM LARVAE -- 1982

by the CFS, the greatest spruce bark beetle damage is in Cape Breton County, where 74% of the spruce stands were found to have one or more beetle-infested trees. Since the mid-1960's, this insect has killed more than 9% of the white spruce in Nova Scotia. The CFS now ranks it close in importance to the spruce budworm, stating that it accounts for much of the spruce mortality.

Other Insects

A number of other insects cause varying degrees of damage to our mature forests. These include larch sawfly, eastern larch beetle, hemlock looper, forest tent caterpillar, spruce cone worm and white-marked tussock moth. The eastern larch beetle, for example, has killed more than 60% of the merchantable larch since 1978, and has also successfully attacked and killed smaller trees. The gypsy moth, which has recently been detected in the Annapolis Valley and western Nova Scotia, has the potential of causing serious damage, especially to the hardwood forests of Nova Scotia. This insect will feed on 500 different species of vegetation, including all the softwood and hardwood species, as well as orchard trees and ornamentals.

Diseases

A variety of diseases can have a serious effect on the quality and survival of the forest. Among the most important of these diseases is birch dieback. During the 10-year period between 1943 and 1952, this disease caused widespread mortality throughout the province. The openings in the tree canopy and the still evident remains of fallen white and yellow birch trees attest to the severity of this disease. The fear of white pine blister rust in combination with the white pine weevil, has been responsible for greatly limiting the planting of this species in Nova Scotia and elsewhere. Other diseases which are important include various root rots, hypoxylon canker, Dutch elm disease, various rusts and needle casts. Beech bark disease has virtually eliminated the possibility of beech ever becoming an important commercial species in Nova Scotia.

Summary

The spruce budworm is Nova Scotia's number one forest pest problem. Estimated losses to date in Cape Breton and Cumberland County are 24 000 000 m^3 (11.0 million cords). This loss does not include (i) the considerable volume of weakened spruce and fir expected to die in the near future, and (ii) the living merchantable softwood and hardwood volume rendered uneconomic to harvest because it occurs in stands with a high component of dead or otherwise unmerchantable or unsalvagable stems.

A salvage program initiated on Cape Breton Island in 1977 and accelerated in 1978 when the Subsidiary Agreement for Forestry was amended, provided for the salvage and storage of approximately 1 104 000 m^3 (500,000 cords). An estimated additional 2 200 000 m^3 (1.0 million cords) were salvaged and forwarded directly to the mill.

To date protection efforts have been limited to the application of Bacillus thuringiensis kurstaki (B.t.k.). This has been confined to a small percentage of the total area infested, primarily because much of the area where the mortality has occurred could no longer be effectively protected when the B.t.k. was first used operationally.

Besides the budworm there are many other insects and diseases which do or may cause considerable damage, including the spruce beetle, birch dieback, white pine blister rust, the hemlock looper, eastern larch beetle, spruce cone worm, forest tent caterpillar and the tussock moth. The gypsy moth, a newcomer to the forests of Nova Scotia, has the potential of causing serious damage, especially to the hardwood forests.

7

Forest Management

7. FOREST MANAGEMENT

Because of past highgrading practices, lack of attention to silviculture, and failure to adequately protect the forest from large-scale insect attacks, the future of the forest industry has been placed in jeopardy. The solution to the problem lies in the adoption of a program of intensive forest management including the essential element of protection. The need for such a program has been recognized by all sectors of the forest community. Adoption of the various techniques of intensive forest management, discussed in detail below, will permit the annual harvest and the significant industrial activity dependent on it to be maintained in the short run and, we hope, expanded in the longer term.

Allowable Annual Cut

The Allowable Annual Cut (AAC) is defined as the annual volume of wood that can be harvested from a given area of forest land for a specified period. Until recently the AAC in Nova Scotia and elsewhere was calculated using conventional simple mathematical formulas. For example, in the late 1950's and 1960's, the AAC for the province was calculated by dividing the gross merchantable volume derived from the forest inventory by 1/2 the rotation age. As wood supply became critical, concern about possible shortages precipitated the development of a computer model capable of rapidly simulating the effect of various management alternatives and/or disasters on the immediate and long term supply of wood. The output from this model is used in formulating management strategies to achieve certain goals or to overcome specific supply problems.

The model was designed to accommodate a wide variety of factors in the calculation. These factors include:

- desired rotation age.
- expected abnormal losses to insects, diseases, fires, hurricanes, etc.
- availability of land for forest management.
- eligibility and priority for harvesting, forest renewal and stand tending, defined in terms of stand age, site capability, stocking class, cover type, etc.
- size of the silviculture program specified in terms of area to be planted, thinned, cleaned, salvaged, etc.
- method of harvest including selective cutting, shelterwood cutting and/or full tree harvest cutting.
- deductions from inventory for cull, waste, inaccessibility, green belts, etc.

This type of information, specified for the beginning of each simulation period, provides the commands required by the model to harvest, treat and grow the forest. The process is repeated for each simulation period until rotation age is reached.

The results of the simulation are expressed in tabular form and include:

- maximum harvestable volumes (AAC) by product, cover type, geographical location and ownership for both softwoods and hardwoods;
- the stand types (specified in terms of age, site, cover type, stand structure, etc.) to be harvested each period, together with their associated areas and volumes;

- the area and volume of harvestable stands (in any one period) that exceed the specified harvest;
- proportion of land to be harvested on different ownership classes to produce a predetermined harvest according to pre-selected eligibility parameters and priorities for harvest, silviculture treatments and land ownership;
- updated inventories at the beginning of each period including their associated areas and volumes.

The results of 3 simulations are discussed in the following pages under "Alternative Levels of Silvicultural Input".

Forest Management Techniques

Clearcutting:

Clearcutting or some variation thereof is the most common harvest method in Nova Scotia. Given existing forest conditions it is likely to continue as such in future.

Much of the softwood forest, especially in eastern and to a lesser extent central Nova Scotia, is evenaged and mature to overmature. It consists of short-lived species that have been seriously attacked by various species of insects including the spruce budworm, spruce bark beetle, balsam fir weevil and the white marked tussock moth. These stands are usually characterized by a high mortality. Growth is slow - often even less than mortality. Given these conditions, partial cutting (i.e. thinning, selection or shelterwood) is impracticable.

Even in healthy mature stands of softwoods, partial cutting is often not a viable option. Over-crowding throughout the life of the stand has made individual stems tall and whippy with narrow crowns and weak root systems. Partial cutting in such stands can result in severe blowdown or breakage. Therefore such stands are normally clearcut.

Where natural unmanaged mature healthy forests are growing on shallow soils, exposed sites and/or poorly drained sites, partial cuts are again generally inadvisable because of the shallow rooting and risk of blowdown.

In other cases, the clearcut method is employed by landowners simply because they require the income now rather than in the future, and/or because clearcutting is the most economic method of harvest.

Nova Scotia is fortunate in that some two-thirds of the area harvested regenerates naturally to commercial softwood and hardwood species. In future, therefore--even under an intensified management program--most new forests will originate from natural regeneration as they have in the past.

Where stand and site conditions are suitable, the narrow strip and small patch methods are efficient for naturally regenerating most species.

Selection Cutting:

This method involves harvesting individual trees or groups of trees within a stand. The openings create the conditions necessary for the natural establishment and survival of seedlings, thereby ensuring that a forest of mixed ages and sizes will be perpetuated. The method is capable of providing a quality harvest every 15 to 20 years. This system, which is also called uneven-aged management, works best with red spruce, hemlock, sugar maple and white ash, each of which can tolerate heavy shade in youth. Because of the difficulty of felling and extracting trees without damaging younger trees, and because larger areas must be covered to extract the same volume of timber, logging costs are higher.

Shelterwood System:

The shelterwood harvest system is designed to create even-aged stands by one or more partial cuts carried out a decade or so before the final harvest. This reduces logging costs somewhat, and creates the conditions of light and moisture needed for successful natural regeneration of desired species.

Both the selection and shelterwood system of harvesting are usually restricted to mature stands of the more shade-tolerant species such as sugar maple, yellow birch, red spruce and hemlock. Suitable stands are located mostly in the central and western regions of the province.

Planting:

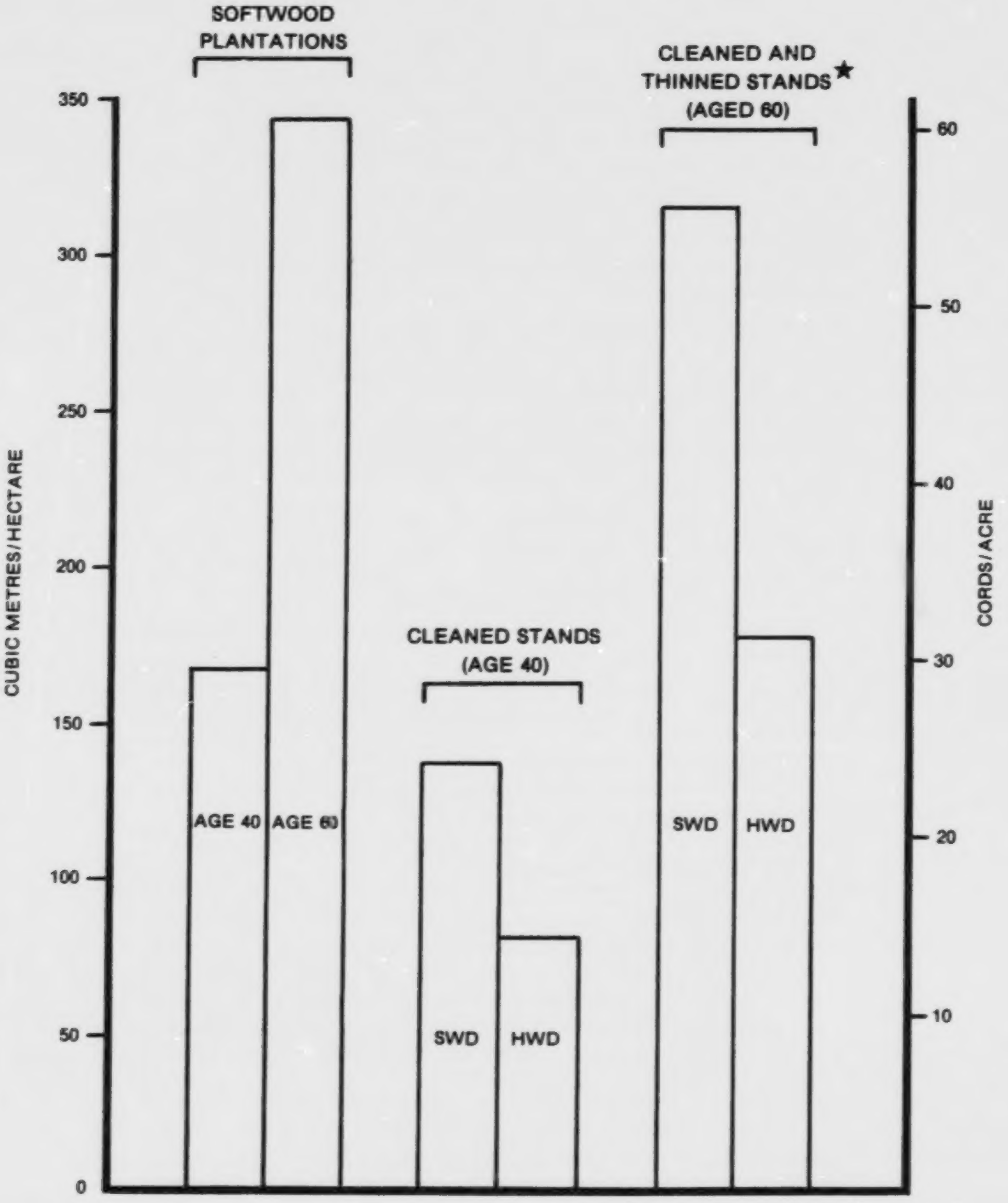
Our research confirms that about a third of the softwood area harvested each year does not regenerate adequately. Not planting these areas will substantially reduce the future harvest. To deal with this problem, government and industry have built new forest tree nurseries and/or expanded existing facilities. Beginning in the mid-1980's, these can produce 28 to 30 million seedlings annually, sufficient to reforest about 10 000 ha (24,700 acres) annually, or one-third of the estimated 28 000 ha (70,000 acres) of softwood forest harvested each year.

Our research further indicates that plantations will yield 168 m^3/ha (30 cords/acre) in 40 years (Figure 44), assuming a seedling survival of 70% on average sites. If sawlogs are desired and one commercial thinning is carried out at age 30 (yielding 84 m^3/ha (15 cords/acre)), plantations can be expected to yield 262 m^3/ha (48 cords/acre or 24,000 f.b.m./acre) at 60 years.

Today, balsam fir dominates the Cape Breton Highlands. By 1985, there will be approximately 38 500 ha (95,100 acres) of recent cutover there. With the nursery capacity

FIG. 44

PROJECTED AVERAGE YIELDS FROM MANAGED STANDS



★ YIELD FROM 60-YEAR-OLD MANAGED STANDS INCLUDES VOLUME DERIVED FROM THINNING AT AGE 40.

available, we will have the capability to reforest this area at the rate of 2 200 ha·a (5,400 acres/year) with black spruce and/or white spruce and larch. Such a planting program, combined with other silviculture measures, can significantly reduce the susceptibility of the future forest to losses from budworm and will serve to brighten the future supply picture.

Cleaning:

Naturally regenerating softwood stands often contain too many seedlings for rapid diameter growth. Normally these stands will not be ready to harvest until they are 60-80 years of age. Early spacing or cleaning such stands when they are 5 to 20 feet tall will increase the rate of diameter growth enough to allow harvest at 30 to 40 years. At that time they will average 140 m^3/ha (25 cords/acre) on typical sites (Figure 44). If sawlogs are desired, the spaced stands can be thinned at age 30 to 40 and harvested at age 60, when the average diameter of the stand will be approximately 25 cm (10 inches) and the average softwood volume will be 250 m^3/ha (45 cords/acre). The corresponding volumes for hardwood and mixedwood stands would equal 140 and 168 m^3/ha (25-30 cords/acre) respectively. Including the volume of wood obtained from the thinnings, the total harvest over the 60-year rotation can exceed the expected yield from unmanaged stands by as much as 200%.

Another advantage of cleaning naturally regenerated softwood and hardwood stands is that it permits selection of insect and disease resistant crop species. Less desirable species and trees of poor quality or low vigor are removed, leaving the remaining trees with space necessary to grow rapidly in diameter, and to become windfirm, healthy and vigorous.

Commercial Thinning:

Commercial thinning is normally restricted to stands with an average diameter of 15 cm (6 inches) or greater. At this point Mean Annual Increment in fibre production has peaked and almost all trees are merchantable and harvestable. A key reason for thinning is to harvest some of the volume normally lost to natural mortality. Careful selection permits later growth to be concentrated on trees capable of producing high value products. The expected increase in productivity from so doing is 25 to 30%. Normally 30 to 50% of the volume is removed in one operation, followed by a shelterwood harvest or clearcut 20 to 30 years later. Thinning also permits the size and quality of the remaining trees to be improved while creating vigorous, more insect-resistant stands.

For example, the goal of thinning operations conducted in red spruce and balsam fir stands would be to remove the short-lived balsam fir before it is killed by the balsam woolly aphid and/or spruce budworm, and to leave, as crop trees, the red spruce which is longer-lived and more insect-resistant and offers a higher value. Salvageable dead and dying trees, regardless of species, would also be removed. This eliminates potential breeding centres for various insects such as the spruce bark beetle. In fact, thinning is one of the best defences against the spread of spruce bark beetle from infected to healthy trees.

For reasons specified under "Clearcutting", areas of forest suitable for commercial thinning are estimated to be about 7 000 ha/year (17,000 acres/year) to the year 2000.

Fertilization:

With the exception of Christmas tree operations, applying commercial fertilizers to unmanaged forest land in Nova Scotia is rarely done because many of the treated trees will die before harvest. Moreover, fertilization is an extremely costly method of producing additional wood fibre. As a treatment it is usually reserved for amplifying increases already obtained from other less expensive management techniques. Thus, in countries such as Sweden, where the forests have been managed intensively for many years, aerial fertilization 20 years prior to harvest is common. A 10% increase in the allowable annual cut is the justification.

Salvage:

As noted elsewhere in this report some 400 000 ha (1,000,000 acres) of forest (i.e. 10% of Nova Scotia's productive forest land) is over 60 years of age and less than 40% stocked. Such areas can be described as silvicultural slums. They are characterized by very low volume (an average 39 m^3/ha (7 cords/acre) and a growth rate that fails to keep pace with losses. Because such stands normally do not regenerate naturally, a program of salvage and planting is the best prescription for restoring these sites to productivity.

Protection:

Protection is an integral part of forest management. If the industry is to be maintained and expanded, both managed and unmanaged forest must be protected. Because of its importance, protection is discussed in greater detail in Chapter 8.

Alternative Levels of Silvicultural Input

To illustrate the impact of silviculture on wood supply, three alternative levels of input are outlined briefly below. Annual Allowable Cut (AAC) estimates are based on a computer simulation model operated by the Nova Scotia Department of Lands and Forests, utilizing inventory, research and other data.

Scenario 1 - No Investment:

In the absence of silvicultural inputs, the sustainable AAC for softwoods for the province has been calculated at 2 400 000 m^3 (1,077,000 cords) (Figure 45). Since industry requires an average of 3 300 000 m^3 (1,500,000 cords) of softwood annually to operate at or near capacity, a complete lack of investment in silviculture would mean serious over-cutting with consequent depletion of the softwood resources. Moreover, since much of the volume losses caused by insect damage are concentrated in the seven eastern counties, it is possible that the reduction in harvesting would cause partial or full closure of the Nova Scotia Forest Industries (N.S.F.I.) pulp and paper mill.

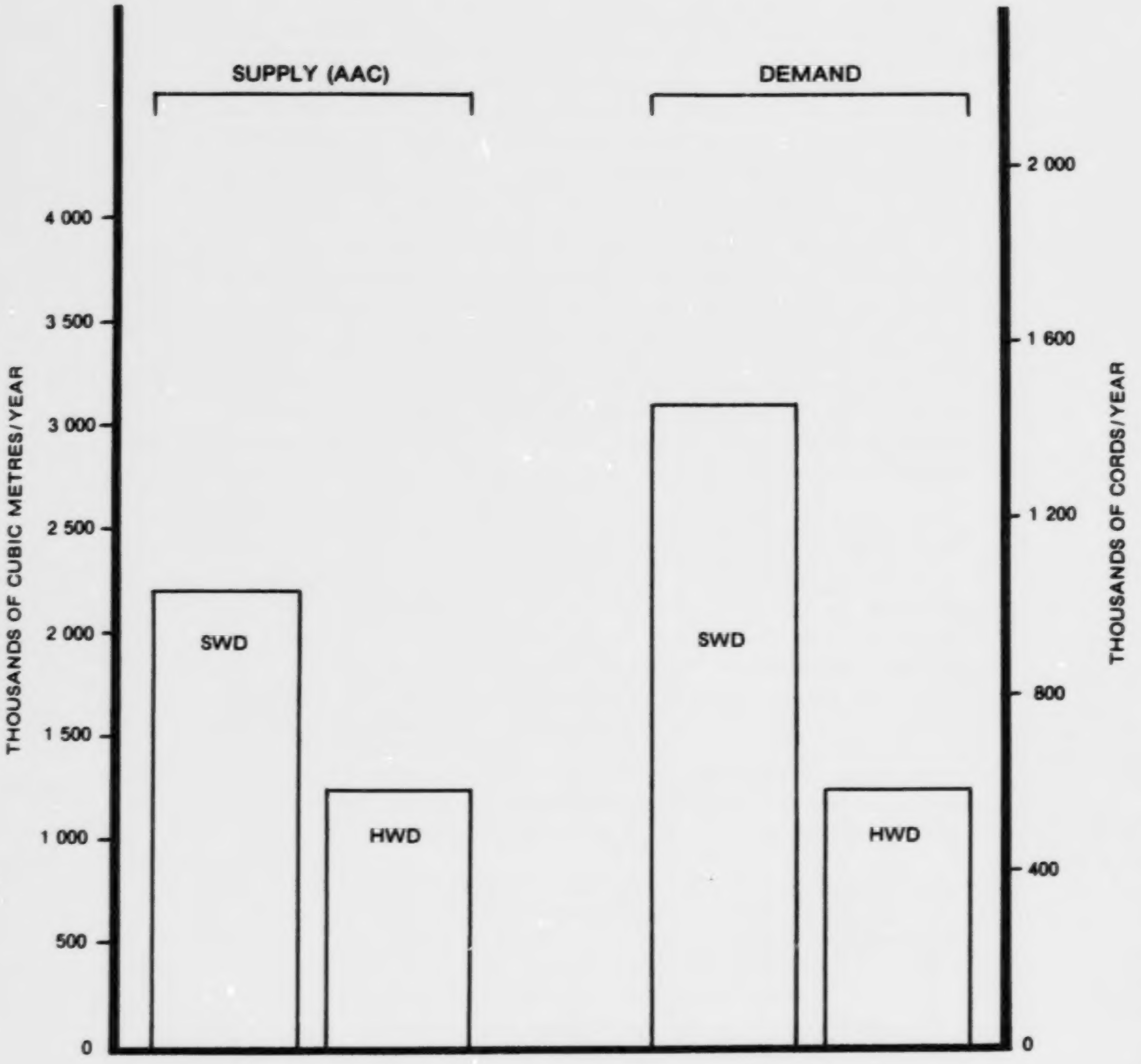
N.S.F.I. has historically obtained virtually all its wood from the 7 eastern counties (eastern region). It processes upwards of 1 214 000 m^3 (550,000 cords) of softwood harvested annually in this region. With no silviculture, the softwood AAC for this region will drop to 550 000 m^3 (250,000 cords) leaving N.S.F.I. with an insurmountable supply problem. Using more hardwood could alleviate the supply problem, but would eventually leave an unmanageable wood deficit.

While the exact timing of the projected decrease in harvesting would depend largely on the behaviour of industry in the face of wood shortages, there is little doubt that a substantial drop in harvesting is inevitable under this Scenario. If the indicated deficit were to be reflected immediately, the employment loss could be as much as 3,000 direct and 6,000 indirect jobs.

The provincial AAC for hardwood under Scenario 1 is 1 300 000 m^3 (600,000 cords). The reported annual cut for hardwood is less than 440 000 m^3 (200,000 cords). The non-reported firewood cut from small private lands is unknown, but is escalating due to increasing oil costs and the off oil government subsidy programs. Because of this increasing hardwood demand, significant surpluses of hardwood, at least in the short run, are not anticipated.

FIG. 45

ALLOWABLE ANNUAL CUT - NO SILVICULTURAL INVESTMENT
(SCENARIO No. 1)



In addition to the predicted loss of jobs and incomes, failure to invest in silviculture would have two other unfortunate effects. Firstly, vulnerability of the forest would be increased. The present forest in eastern Nova Scotia is extremely vulnerable to damage by insects, disease and blowdown. Clearly, the best way to minimize losses is to harvest the mature portion in the shortest possible time. This solution is possible under this scenario, but only if we are prepared to mine the forest and to suffer a catastrophic reduction in forest harvesting and related manufacturing once the harvest is complete. We would also seriously limit our future management options for the 7 eastern counties.

The alternative is to sustain the harvest at a lower level and accept a 70-year rotation. This longer rotation would mean that the first-rotation stands would be approximately 100 years of age when harvested--an age well beyond the normal rotation age of white spruce, balsam fir and black spruce. To allow the forest to reach this state of overmaturity would result in substantially higher losses to insects, diseases and blowdown.

Secondly, the quality of the forest would be reduced. Silviculture is essential if quality forests are to be produced in a reasonable time. In the past, quality products were obtained primarily from the harvest of virgin forests composed of long-lived trees which took 200 to 300 years to mature. Most such forests have now been harvested. The supply of quality lumber is therefore substantially reduced. Under the No Investment Scenario this shortage would become more acute. Seventy-year-old stands, in the absence of intensive silviculture practices, are incapable of supplying the volumes of larger diameter logs which the sawmill industry requires.

Scenario 2 - Present Level

The reduction in harvesting and attendant losses of jobs and incomes postulated under Scenario 1 can be avoided by maintaining a suitable silviculture program. In fact, the softwood harvest can be maintained at the present level

(Figure 46) if silviculture treatments are maintained at the 1981 level (Figure 47), and if projected abnormal losses to injurious agents do not exceed expectations.

Much of the stimulus for this silviculture activity is derived from federal/provincial forest management programs. These programs have been available on all tenure classes, and have been well received by industry and woodlot owners. Failure to maintain silviculture treatments at about the current level for a full rotation will mean a commensurate reduction in the AAC.

Because hardwoods, for all intents and purposes, are not being managed, at this level of investment the AAC for hardwoods would remain the same as for Scenario 1. This lack of hardwood management would mean that the percentage of the future harvest suitable for products other than pulpwood would not change appreciably. At present, forest inventory studies indicate that only 16% of the total merchantable hardwood volume is classified as having sawlog potential.

In addition to maintaining jobs and incomes, investment in silviculture at present levels has three other advantages:

- Long term supply of softwood would be increased. At this level of input the softwood harvest can be increased gradually to 4 000 000 m^3 (1,800,000 cords) by the year 2040 (Figure 48). The recently signed Forest Resource Development Agreement is capable of maintaining inputs at the required level for the next 5 years.
- Rotation age would be reduced and harvest of the high risk forest accelerated. This would permit the existing mature to overmature forest to be harvested much sooner. Such an accelerated harvest is considered essential if future losses to insects and diseases are to be kept to a minimum and if the opportunity for a substantial harvest of salvageable wood is to be realized. This advantage is especially important in the 7 eastern counties. There the present softwood cut is 1 545 000 m^3.a (699,000 cords/year). Therefore, continuation of the harvest

FIG. 46

ALLOWABLE ANNUAL CUT 1981-1985
PRESENT SILVICULTURAL INVESTMENT
(SCENARIO No. 2)

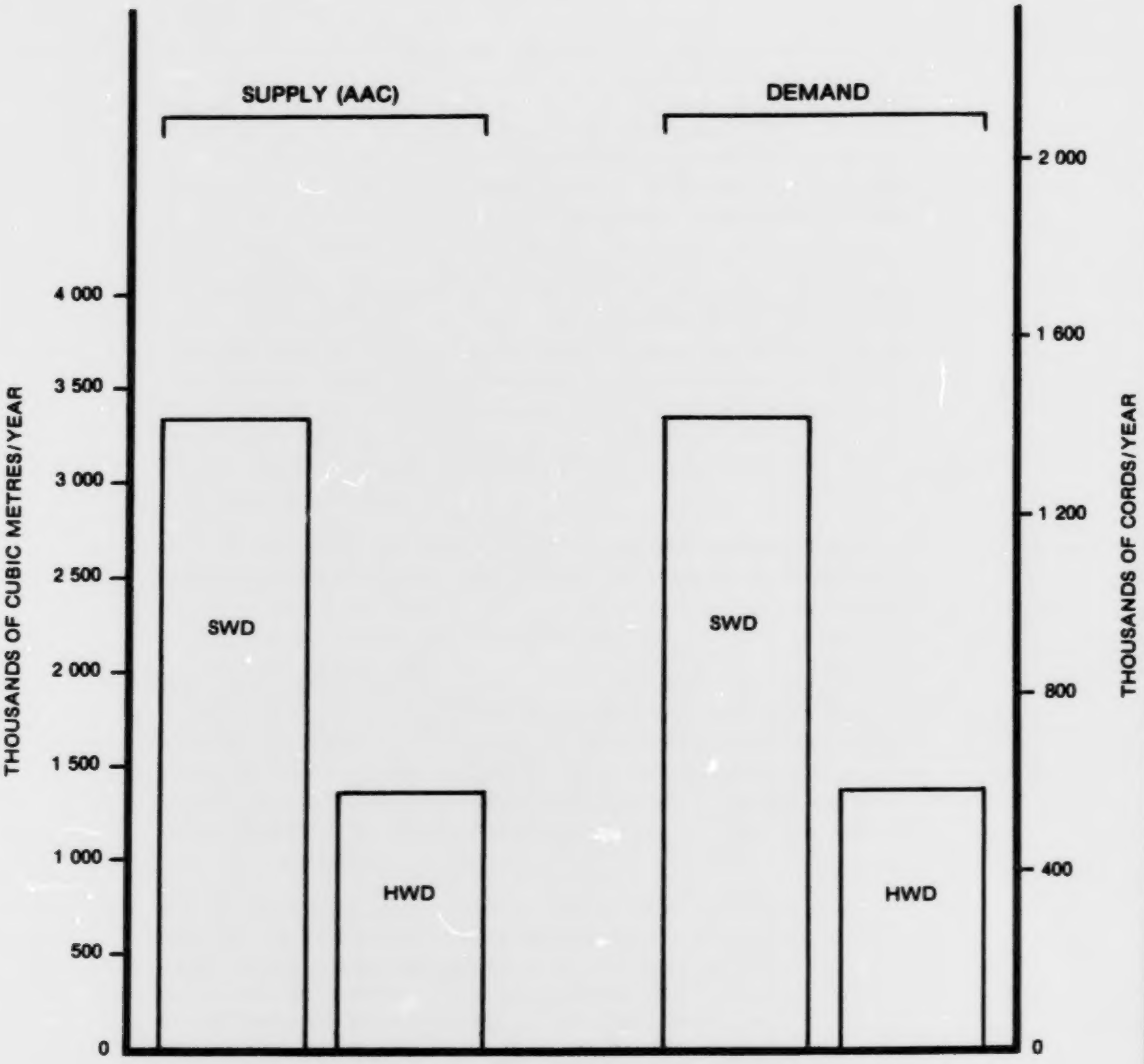


FIG. 47

PROJECTED ANNUAL AREA REQUIRING VARIOUS TYPES OF SILVICULTURE TREATMENT FOR SCENARIOS 2 AND 3.

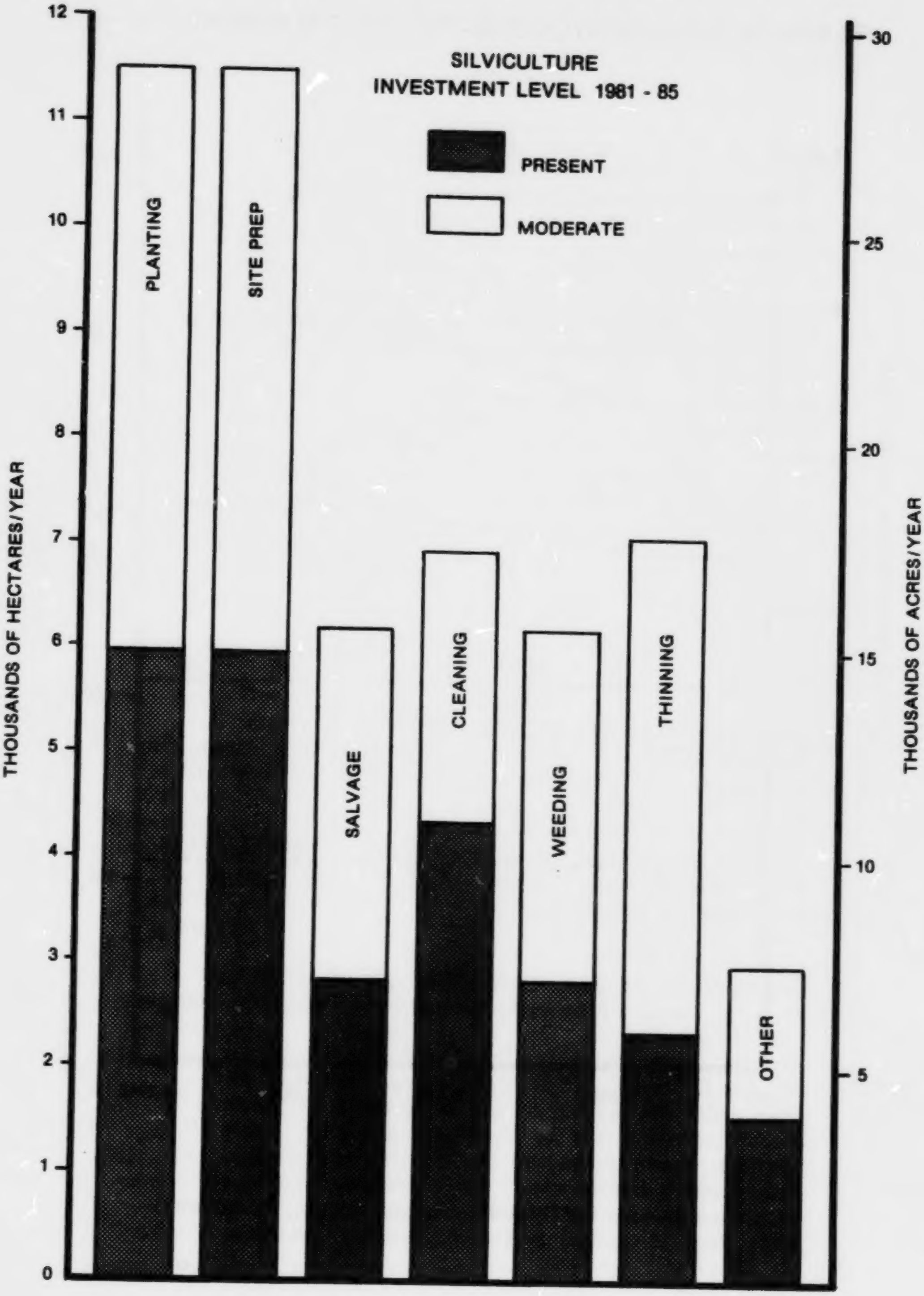
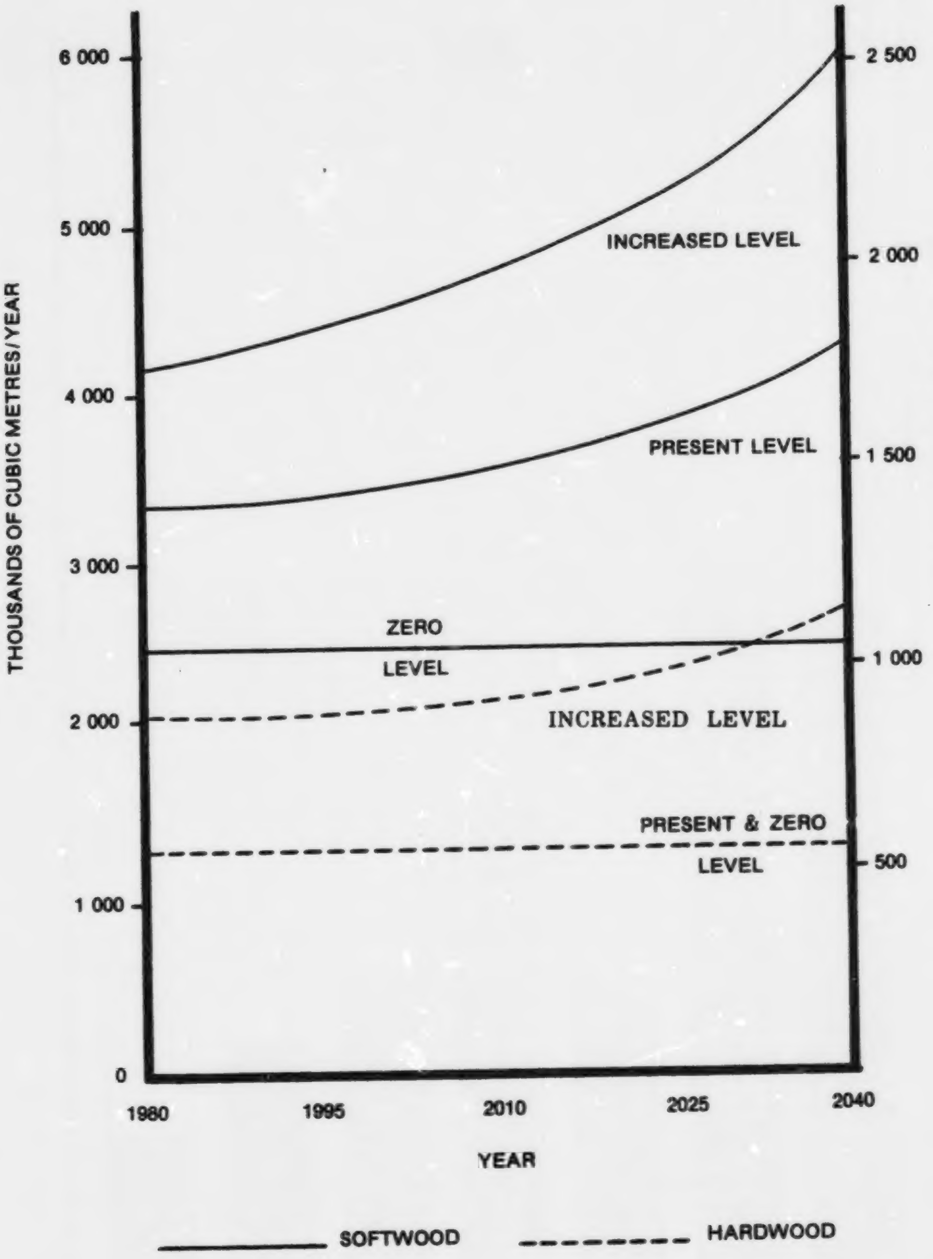


FIG. 48

EFFECT OF SILVICULTURAL INVESTMENT ON SOFTWOOD AND HARDWOOD ROUNDWOOD SUPPLY FOR THE PERIOD 1981-2040



at the present level will result in an overcut, which will be balanced by an undercut in the remainder of the province. In this instance, given the susceptible condition of the forest in the 7 eastern counties and the present infestation of spruce budworm and various bark beetles, an overcut is desirable since it will harvest and salvage a high risk forest in a shorter time frame. Failure to do so is to invite losses considerably greater than projected.

- Vulnerability of the forest would be reduced. The larger acreage harvested each year would also permit a more rapid conversion of the forest to less susceptible species through reforestation. At the same time the less vulnerable forest in the remainder of the province would continue to increase in volume and quality.

Scenario 3 - Increased Level:

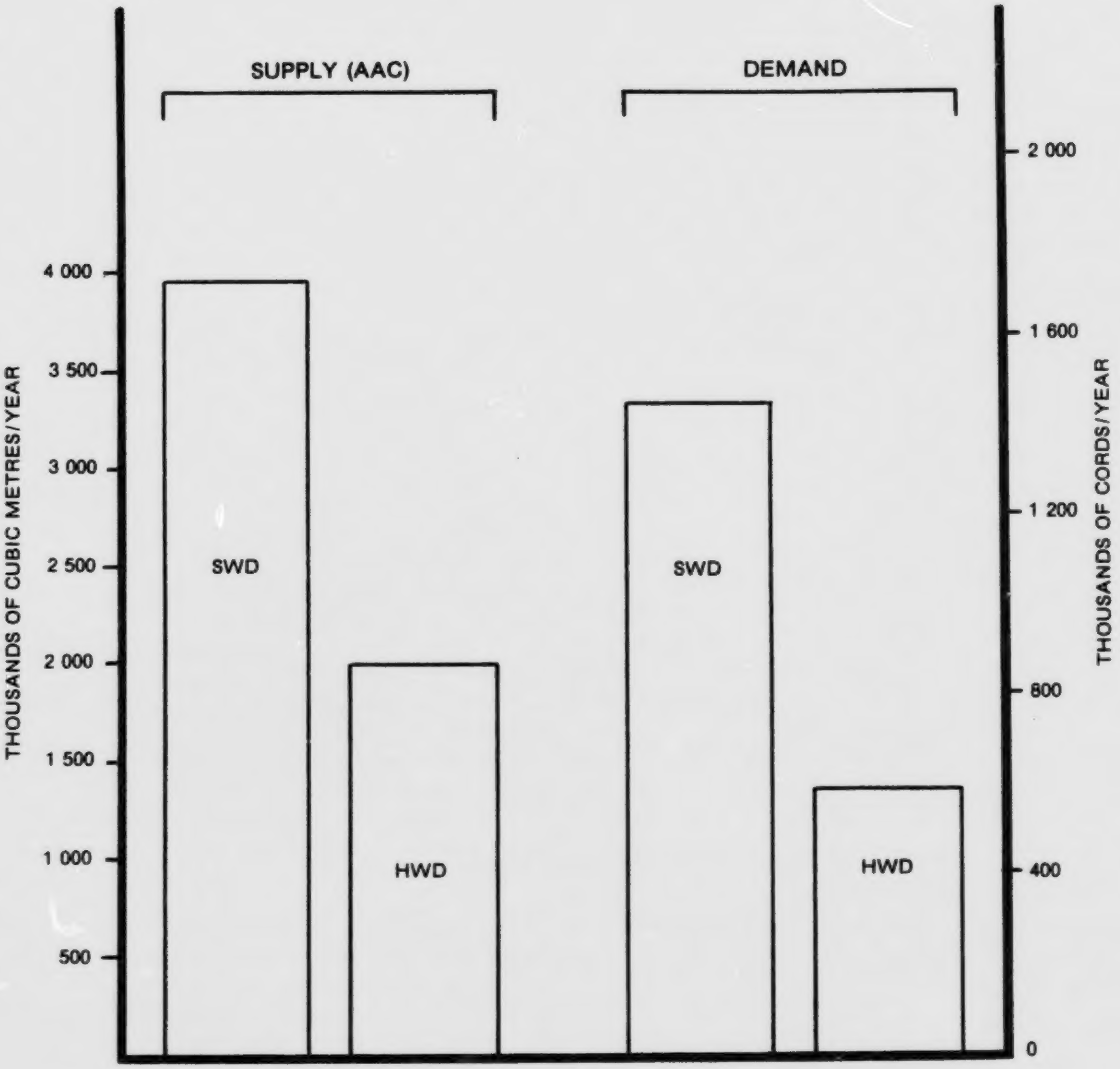
A doubling of silviculture treatments (Figure 47) specified in Scenario 2 would permit the harvest of softwood and hardwood in the next 5-year period to be increased by 20% and 50% respectively (Figure 49). Beyond 1986, the continued and slightly expanded investment in silviculture would allow the annual harvest to be further increased to 5 500 000 m^3 (2.5 million cords) of softwood and 2 420 000 m^3 (1.1 million cords) of hardwood by the year 2040 (Figure 48).

Besides increasing productivity both in the short and long term, Scenario 3 offers four other advantages:

- Increased harvest of natural mortality. Between 1965 and 1975 an estimated 3 526 000 m^3 (1,600,000 cords) of wood were lost to natural mortality each year. (This is exclusive of the abnormal losses caused by the spruce budworm, bark beetles, windthrow, and/or fire.) The proposed thinning program would permit harvesting a portion of the projected natural mortality before or just after

FIG. 49

ALLOWABLE ANNUAL CUT 1981-1985
INCREASED SILVICULTURAL INVESTMENT (SCENARIO NO. 3)



death of these trees. Note that, because of the ownership, composition, structure, age, accessibility, operability, etc. of the stands in which the mortality is occurring, much of this natural mortality cannot be harvested at a reasonable cost.

- Increased production of sawlogs and studwood. The proportion of the AAC suitable for harvest as sawlogs and studwood would increase substantially under this Scenario because of the large acreages cleaned and thinned.
- Increased markets for insect killed wood. Because of the higher harvest levels permitted under this Scenario a greater proportion of insect killed wood, high risk stands, etc., could be salvaged.
- Increased employment. Expanding the forest industry to utilize the surplus hardwoods and increasing the supply of hardwood and softwood directly attributable to silviculture investment would provide significant employment potential within the next 5-year period. Beyond 1987, direct employment could be further increased, provided silviculture is maintained at a sufficiently high level.

Forest Research

The gains in productivity attainable from intensive forest management have been discussed in the preceding section. Research and development are essential to the success of these strategies.

Traditionally, our forest managers have looked to the senior levels of government and in particular to the Canadian Forestry Service (CFS) for leadership in forest research. In recent years, however, the demand has increased. As a result, the Province has assumed a partnership role in forest research with the CFS. The respective roles of the two governments have been formally defined in a recently signed

Memorandum of Understanding Concerning the Co-ordination of Forest Research. Under this agreement the federal government will assume the lead role for long-term research including:

- forest protection;
- effects of acid rain and major forest practices on the environment and/or site productivity; and,
- basic research which transcends provincial boundaries or requires outside expertise.

The provincial government will assume the lead role for short-term research, including:

- Growth and yield computer models capable of quickly and reliably predicting the effect of varying levels of silvicultural investment and/or insect and disease damage on the Allowable Annual Cut, and of evaluating management options.
- Reforestation prescriptions for species, age, type, season, stock quality, fertilizer regime and site preparation method, required to maximize seedling survival and growth and to minimize costs.
- Prescriptions for the most effective herbicide required to successfully control different species of competing vegetation, including type, best method and time of application, minimum volume of solution, and safety precautions or environmental restrictions.
- Prescriptions for silvicultural and/or harvesting methods to achieve adequate natural regeneraton.
- Evaluation of new and old cutting methods to determine their silvicultural and economic suitability.
- Prescriptions indicating the machine(s) which will do the best job both from an ecological and economic standpoint for each of the major types of sites and stands and forest management treatments.

- Investigation of available computerized mapping and data storage systems to determine their suitability for forestry needs in Nova Scotia and to recommend the purchase and/or modification of such systems.

- Develop and refine ecological methods of land classification for long range land use management plans and policies.

- Conduct provenance trials to determine the seed sources and species best suited to the various eco-regions in the province.

- Evaluation of various types of satellite or aircraft imagery and the technical equipment available to analyse this imagery to increase the accuracy of resource information collected and to reduce the cost of collecting this information.

- Nursery trials to reduce production costs and increase the quality of stock.

- Christmas tree trials to determine the cultural practices required to optimize quality and minimize production costs to help ensure that our industry remains competitive.

To fulfill this research mandate requires a greater provincial commitment of staff and resources than in the past. If it is not forthcoming, individual agencies will likely establish their own in-house research capability. Or, they may spend silviculture funds on a trial and error basis, simply because the research results required to make the best decisions are not available. This can lead to an uncoordinated approach to research, duplication of effort by various agencies, poor transfer of results to user agencies and even contradictory information due to inadequate or inappropriate experiment design. The result is slower progress and wasted funds.

For these reasons, it is essential that an adequate central research capability (both in terms of manpower and technical expertise) be established to meet the short-term research needs of all landowners in the province. Such an agency, working with the Federal government, the forest landowners and industry, can ensure that the "wheel is not continually re-invented" and that the resources devoted to research will provide the desired results.

Having landowners and industry participate in an integrated research program is extremely important, for two reasons. Firstly, they have the equipment, manpower and expertise to efficiently carry out the operational part of the field experiments. Secondly, it is essential to maintain an exchange of information between the people doing the research and the people who will use the results.

Forest Management Planning

The Department of Lands and Forests has made significant progress in forest management planning over the last decade or so. Efforts to manage Crown lands in an ecologically sound and cost-effective manner are continuing. A Forest Access Road Planning and Construction Manual was recently placed in use. Work on other forest management guidelines is continuing for application on Crown lands and private land programs in which the Department is involved.

Crown Lands:

The long term license agreements contain specific forest management planning requirements. Plans are prepared by the licensees and submitted to the Department for field inspection by staff. Recommended operations must be approved by the Minister before work commences. On other Crown lands the Department is directly responsible for forest management planning and for the implementation of approved plans.

With the inception of the Subsidiary Agreement for Forestry, procedures required the designation of blocks of Crown land upon which management would be performed. In most cases, the larger contiguous blocks of Crown land were selected in each county and management plans were prepared for these larger blocks. Approximately 162 000 ha (400,000 acres) of land were put under management in this way.

These block plans were for a 5-year period and contained a description of the block of land, its location, the type and condition of the forest on it, its proximity to a labour market and information on past harvesting, silviculture and road building activities. These plans enumerated the acreage of each treatment that were recommended for implementation during the ensuing 5 year period. Subordinate to these plans were annual operating plans which identified the stands that were to be treated, the location of the roads that were to be built, plus any other activities planned during the year. The annual plan was submitted for approval and was subsequently implemented to the level of funding available that year. At the termination of each year an annual report was prepared which identified the treatments and other activities that were actually performed. This information was reviewed and filed for historical reference.

This approach did not cover all Crown land operations. Only those Crown lands for which plans had been written qualified for forest management. Furthermore, there was no documented justification for the silviculture program that was recommended in these plans. To provide a more comprehensive basis for decision-making, the Department is in the process of developing a two level plan approach to forest management beginning with a Provincial Plan.

This level 1 plan will specify, on a provincial basis, the Department's policy on forest management issues such as integrated land use and forest protection, and identifies allowable annual cuts (AAC) for each land ownership category, as well as the annual drain. The plan goes on to identify the types of silviculture techniques required. Much of this information is discussed in the preceding section. Final documentation for the level 1 plan will, however, await the final report and recommendations of the Royal Commission on Forestry.

The second level of planning includes a Subdivision plan. This plan will be for a 20-year period for each of the 8 sub-divisions. Along with a description of the forest, the plan describes the silviculture activities required to increase the growth of the forests to the point where they can sustain the annual drain. With this information, the manager of the Subdivision can plan his forest management operations well into the future, identifying manpower requirements, equipment and material needs and, above all, costs.

The Subdivision plan includes AAC/drain comparisons for the small and large private ownership categories. Forest management activities required to meet the projected drain for all private lands are identified.

The second level of planning in this approach also includes a 5-year Operating Plan which involves Crown land only. It identifies the location of forest management activities in terms of silviculture acreages, harvest cut acreages, miles of road to built by class, and any other silviculture or activity that is necessary. This information is complete with costs and anticipated revenues.

On Crown lands the Annual Plan constitutes the final stage in the second level of this planning procedure. It will identify the management activities that will take place during a 12-month period. As each operation is completed the details of the job (i.e. treatment, acreage, volume removed, location, stand no., etc.) will be forwarded to a central office for storage on computer accessed files. This will allow for quick and accurate retrieval and analysis of all information on forest management activities on Crown lands.

At all stages of the planning process, it is the intention of the Department to give due consideration to wildlife and outdoor recreation opportunities. However, it is assumed that forest management objectives will continue to be the primary consideration in the planning process.

Private Owners:

The owners of large private holdings generally have the professional and technical capability to adequately plan forestry operations. This is particularly true of the pulp and paper companies which dominate this category of ownership. In order to receive incentive assistance under the federal/provincial agreement, owners in this category must submit a propsal in the form of an operational plan describing the work to be performed. All such proposals are field checked by Lands and Forests staff to ensure that the treatments proposed conform to acceptable standards and are to be recommended in the context of good forest management. The operational plans are then amended as required and approved for funding support where the work is deemed desirable.

Small Holdings:

In order to ensure that forest management operations were being planned within a reasonable framework, an approved forest management plan following a format developed by Lands and Forests was a prerequisite to obtaining financial support under the Canada/Nova Scotia Subsidiary Agreement for Forestry.

This requirement is being continued under the new federal/provincial agreement. The primary purpose of the forest management plan is to help promote better forest practices in Nova Scotia's private woodlands, by identifying and organizing work to be done.

Applications for forest management planning are received by the Department from individuals, partnerships, municipal governments, associations, companies and corporations owning or controlling forest land in Nova Scotia.

Upon receipt of an application, Lands and Forests staff will explain to the applicant the Forest Resource Enhancement on Private Lands Program contained in the Forest Resource Development Agreement. They then endeavor to obtain all relevant information pertaining to the applicant's forest land holdings and land use management objectives. When an understanding of the program is reached to the satisfaction of the applicant and field staff, arrangements will be made to have the required forest management plan prepared. Forest management plans are prepared by the

Department of Lands and Forests Private Lands staff, Group Ventures staff, or by approved forestry consultants.

Ten year forest management plans, revised at 5 year intervals, are written for owners of small private lands from data collected on a descriptive cruise. The descriptive cruise is a sampling procedure designed to provide a description and diagnosis for each forest stand of a woodlot, from which optimum forest management practices can be prescribed.

Specific forest stand treatments are recommended with consideration being accorded the applicant's short and long term land use objectives. A certain amount of negotiation is possible at the first management planning stage if conflicts should arise with forest management objectives.

Environmental concerns such as wildlife, recreation, erosion and water quality are also taken into consideration. Where it is warranted, the mitigating measures to be taken when conducting a treatment are described in the written text of the plan.

Technical advice is given by personnel of the Department of Lands and Forests to assist the woodlot operator to carry out the plan's recommendations. Financial assistance for treatments (1982-1987) will be provided by the Canadian Forestry Service (C.F.S.) under the Forest Resource Development Agreement.

The Need for Incentives

Experience in Nova Scotia (and various other jurisdictions where private ownership predominates) has shown that there are a number of disincentives to more effective management of non-Crown forests. Forestry is necessarily a long term proposition with a pay-off well beyond the life expectancy of most individual owners. Investments in long term management have no apparent impact on quality or price. Conversely, there is no evidence whatsoever to suggest that higher prices will result in an increase in investment in forest management by individual owners. Even with attractive incentives under the ARDA III Forestry program (which terminated in 1976) very little investment in silviculture resulted. At the same time, it has been recognized that a very significant percentage of privately owned forest land in the province has been removed from production because of incompatible objectives of ownership or lack of incentive.

The situation is somewhat different with industrial ownerships which are dominated by pulp and paper companies. However, only recently has this group found investment in silviculture attractive.

Prior to the signing of the Subsidiary Agreement for Forestry in 1977, silviculture funding, apart from direct funding for a modest program on unlicensed Crown land, consisted of the Nova Scotia Pulp Limited stumpage rebate, and limited additional investment by the same company and the Scott Paper Company (now Scott Paper International Inc.). Little activity was to be found on the remaining private ownerships. With the signing of the agreement, the magnitude of the silviculture program increased dramatically on all ownerships. The assistance for private holdings ranged from virtual full reimbursement for improvements on the smaller ownerships to a progressive formula for the pulp and paper companies that has yielded reimbursement for thirty-five to forty percent of total investment. Without these incentives the level of silviculture would drop substanially to something approximating pre-Agreement levels.

As outlined in the preceding discussion, increased productivity on all holdings is necessary if the present level of harvesting is to continue. This will only occur if incentives, such as those available under the Subsidiary Agreement for Forestry and being continued under the Forest Resource Development Agreement, are available in future.

Various alternatives to direct grants have been suggested. Among these, some form of tax incentive would conceivably appeal to industry in particular. However, no such alternative is available at present.

It is clearly desirable to stimulate the greatest degree of private sector participation consistent with overall forest management goals. Incentives, tailored to this requirement, are essential.

Summary

The need for an intensive forest management program to sustain and improve the productivity, quality and diversity of the forest has been recognized by all sectors of the forest community. The annual harvest and the forest industries of Nova Scotia are dependent on such a program. Wood supply analyses indicate that in the absence of silviculture inputs the sustainable harvest for softwoods would be 2 400 000 m^3 (1,077,000 cords). Since the industry requires 3 300 000 m^3 (1,500,000 cords) of softwood annually to operate at or near capacity, the reduction in harvest could result in the loss of as many as 3000 direct jobs and 6000 indirect jobs.

On the other hand, continued investment in silviculture at the levels specified in the recently signed 5-year Forest Resource Development Agreement will permit the present level of harvest to be maintained. This statement is true only if losses to injurious agents do not exceed the estimate. Failure to maintain these silviculture treatments at or above the current level will mean a corresponding reduction in the AAC. In addition to maintaining productivity, the present silviculture program provides the opportunity to significantly improve the age class distribution and the quality and diversity of the forests.

A doubling of the present silviculture program will permit the harvest of both softwood and hardwood to be increased immediately by 20% and 50% respectively. Beyond 1987, continued investment will permit the annual harvest to be further increased to 5 500 000 m^3 (2.5 million cords) of softwood and 2 420 000 m^3 (1.1 million cords) of hardwood by the year 2020.

Expanding the forest industry to utilize the expanded supply of softwood and hardwood directly attributable to silviculture investment provides significant employment opportunities within the next 5-year period. Beyond 1987, direct employment could be further increased.

The need for a forest research effort commensurate with the magnitude of this forest management program is outlined. The primary requirement is the capability to undertake shorter term problem-solving research to obtain results that can be integrated quickly into the forest management effort. It is proposed that this can be done most effectively on a cooperative basis with industry, landowners and the federal government.

The forest management planning process is outlined, including the methods to be employed on Crown lands to ensure that forest management inputs are planned within an appropriate framework and to integrate wildlife and recreation interests.

The need for incentives is also outlined. It is clearly necessary to stimulate the greatest degree of private sector interest and participation consistent with forest management objectives, and to structure incentives to achieve this.

8

Forest Protection

8. FOREST PROTECTION

The 3 management alternatives outlined in the previous chapter assume that abnormal loss of mature timber to fire, insects, disease, blowdown, etc. will not exceed the allowances specified in the scenario assumptions. Given the importance of the industry to Nova Scotians, it is essential that the forest manager have at his disposal the tools required to prevent excessive losses of wood to the various agents of destruction. Without the use of these tools, future investment in forestry, including silviculture, industrial expansion and/or modernization, becomes at best a risky venture, since the future supply of wood can no longer be assured. Protection is part and parcel of good forest management.

Fire

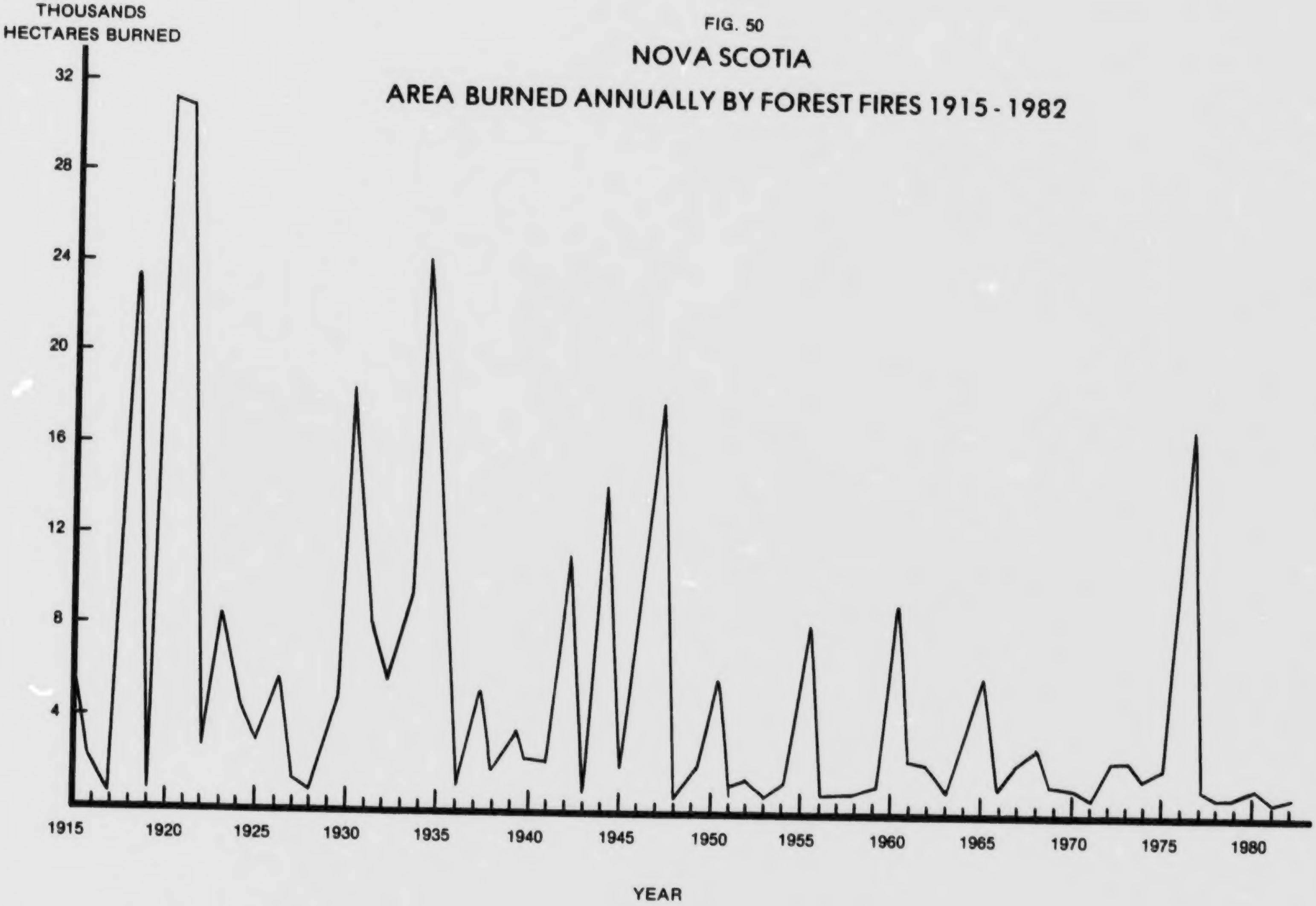
For most people forest protection is likely to mean guarding against fire losses. Historically, wildfire has been very destructive, and much of the early effort of the Department of Lands and Forests was directed at reducing fire losses. The capability to protect against such losses has been improved over the years, especially with the implementation of a fire training program available to industry and volunteer fire dpartments as well as Department staff. The acquisition of up to date fire fighting equipment, the use of helicopters and an integrated mobile radio system have further enhanced fire protection capabilities.

As Figure 50 indicates, the area burned has been reduced substantially since the late 1940's. While 1976 was a particularly bad year with two large fires consuming close to 20 000 ha (50,000 acres), the record in recent years has been

FIG. 50

NOVA SCOTIA

AREA BURNED ANNUALLY BY FOREST FIRES 1915 - 1982



relatively good due to favourable weather conditions and improved fire suppression capabilities. Paradoxically, the number of fires has been increasing as the area burned has been decreasing (Figure 51). This would appear to confirm that prevention and protection efforts are effective. It also highlights the fact that practically all forest fires in Nova Scotia are caused by people or people-related activities.

As the forest lands of the province have become more accessible, the risk of wildfire has obviously increased. Less than 1% of forest fires in Nova Scotia are caused by lightning.

Approximately 90% of fires occur between April and the end of September. Available records also show that half the fires occur in April and May.

Presuppression & Suppression:

Presuppression refers to those control activities undertaken in advance of fire occurrence, and are concerned with the organization, training, and management of a fire control force and the acquisition, maintenance and inspection of equipment and supplies to ensure effective fire suppression.

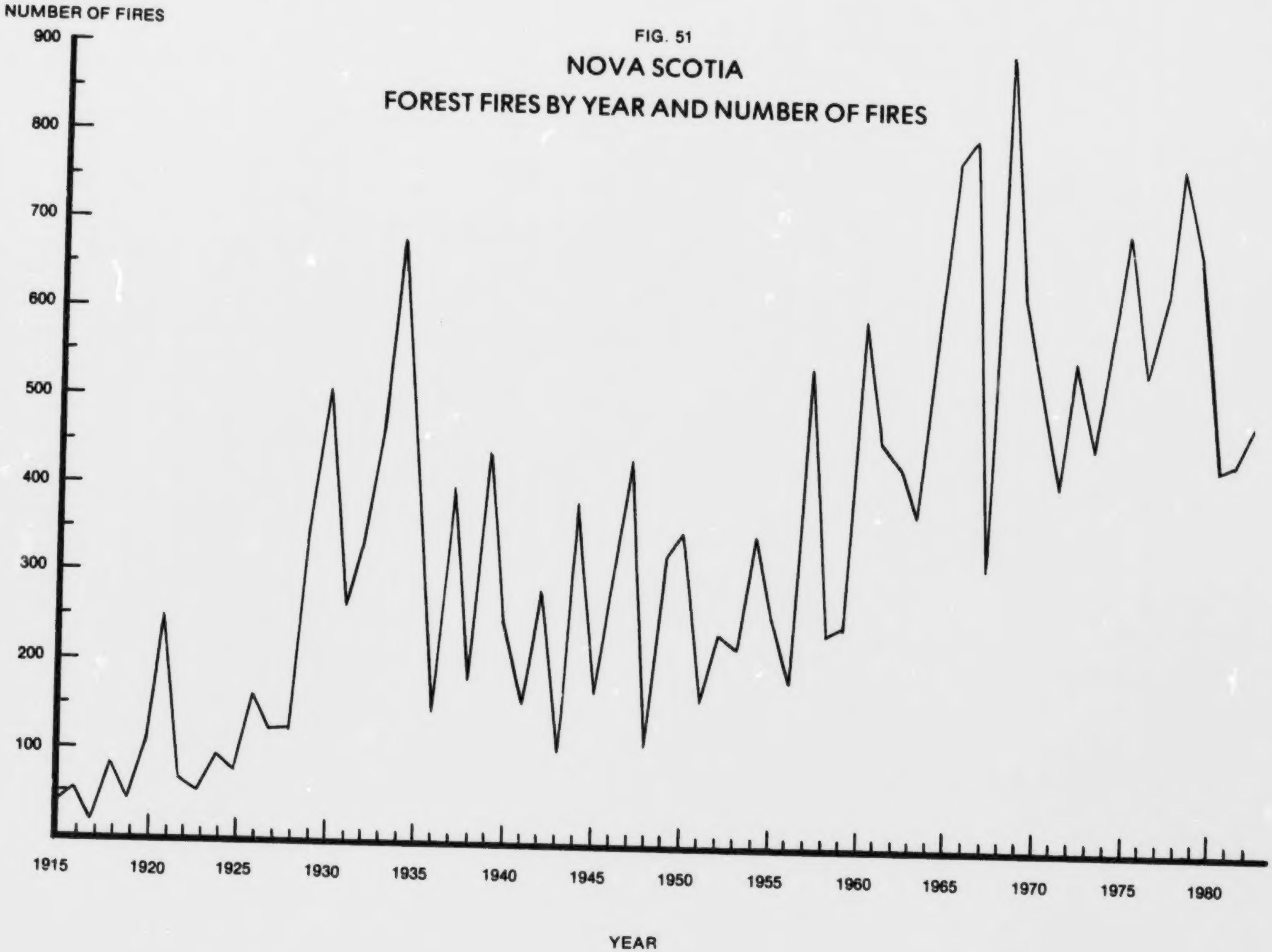
These efforts require coordination with industry and volunteer fire departments to ensure that the most effective suppression force is deployed. The Provincial detection system (fixed and aircraft), the weather reporting system, communication, and training, are major components of the presuppression program.

Suppression includes those activities undertaken to extinguish a fire. They are accomplished through manpower established at the department offices throughout the province. Coordination and assistance is provided by departmental staff to volunteer fire departments and industry crews. The maintenance of a centrally located fire suppression crew at Shubenacadie with air support is a major component of the suppression program.

FIG. 51

NOVA SCOTIA

FOREST FIRES BY YEAR AND NUMBER OF FIRES



Fire Prevention:

As mentioned above, fires in Nova Scotia are practically all caused by man or man/related activities, with less than 1% caused by lightning. As such the majority are at least theoretically preventable.

Several factors contribute to the "fire danger" which is a general term used to express assessment of fixed and variable factors such as cause, fuels, weather, and topography. They influence whether fires will start, spread, and do damage, and also the degree of difficulty of control to be expected.

To reduce fire occurrence the prevention program is directed at those factors over which a significant influence can be made and maintained. Prevention is concentrated on:

- Reducing risk, where "risk" is the probability of fire starting by the presence of and activities of causative agencies (e.g. burning permits).
- Reducing hazard where "hazard" is a fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition (e.g., slash disposal).
- Education.

Prevention methods are continually being upgraded.

Insects

Fire will continue to be a threat to our forest resources and continual efforts and vigilance are clearly warranted. But, as noted elsewhere in this report, protection from other destructive agents is also a critical requirement. It has long been recognized that losses to pests generally outrank those to wildfire. In recent years losses to insects alone have greatly exceeded losses to fire in the province. The losses already experienced as a result of spruce budworm damage were discussed in Chapter 6.

Much has been said about making the forest resistant to insects and diseases by managing "properly". The reality of the situation is that the 4 100 000 ha (10,000,000 acres) of productive forest cannot be changed overnight. It is a slow process requiring many years. The existing largely mature to overmature forest will remain vulnerable to insect attack for decades to come. Given this fact, the spruce budworm, tussock moth, bark beetles and/or other insects and diseases can be expected to continue their wide-scale attacks. If left unchecked, it is probable that they will destroy millions of cords of wood. Volume losses of such magnitude cannot be permitted in the future if we are to maintain the Allowable Annual Cut.

Increased Silviculture Input to Offset Insect Losses:

Increased expenditures on silviculture has often been touted as a viable alternative to spraying. Unfortunately this belief is unfounded, for two reasons.

- Plantations and spaced stands established today will not mature for 40 or more years. Therefore a large proportion of the presently semi-mature-mature forest must be protected to ensure that industry will be adequately supplied with wood during the next 40 years or so. The wood supplies for industry for the next 40 years are already growing somewhere in the province.

- Plantations and spaced stands must also be protected against insect and disease damage. Without protection, these managed stands will not yield the volume of wood required by industry beyond 2020.

While it is not possible to make managed forests immune to pests, it is possible, given sufficient time, to make them more diverse in terms of species mix, stand structure and age class distribution. Bringing this about is one of the main objectives of management. Species to be planted and/or to be selected during spacing operations will be chosen not only for their adaptability to site, but for their resistance to the more destructive pests.

In addition to the requirements for the managed and unmanaged forests, protection from insects will also be required for seed orchards, forest nurseries and research areas.

Weeding

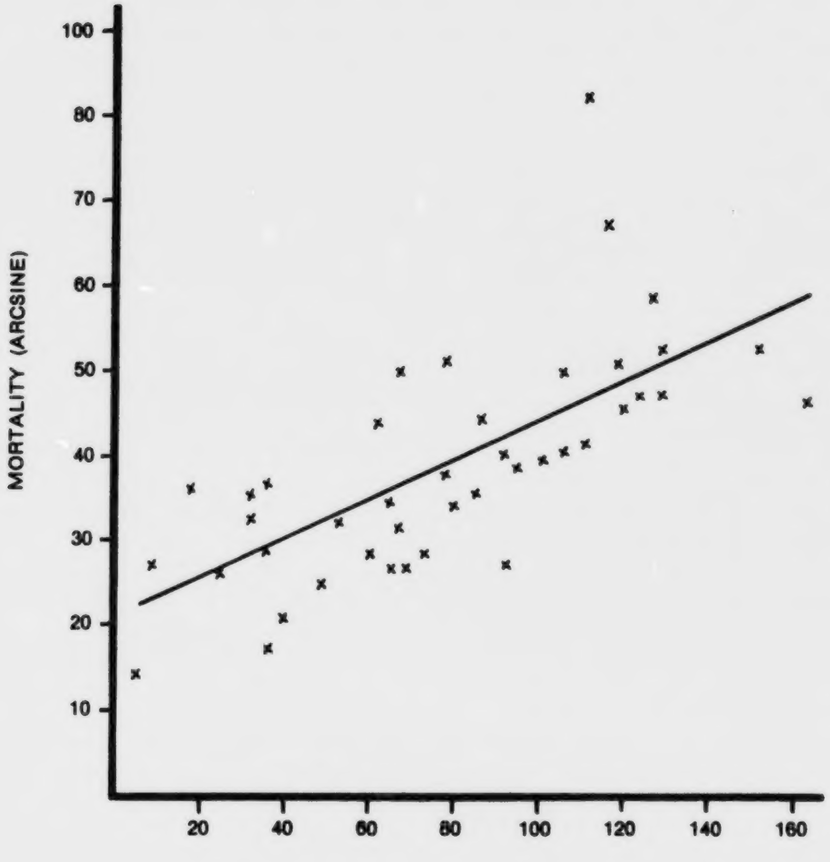
Plantation surveys and studies confirm that growth and survival of planted seedlings are seriously affected by various species of competitive vegetation. Aggressive species like raspberry, pin cherry, poplar, heath vegetation (huckleberry, sheep laurel, etc.), red maple and alder invade the site soon after planting, and quickly overtop the planted conifers. In most instances this either suppresses the growth of the seedlings or kills them outright (Figure 52). For example, a Norway spruce plantation established near New Glasgow in 1970 was still only 1 foot high after 9 growing seasons, with only 50% of planted trees surviving. In contrast, where competing vegetation was suppressed, Norway spruce of the same age had 80% of the seedlings surviving and had reached an average height of 10 feet. Forest plantations need weeding just as urgently as do crops of corn, beans or carrots.

Implications of Not Weeding:

Young plantations where weeding is required would be lost and the investment wasted. More importantly, it would

FIG. 52

RELATIONSHIP BETWEEN SEEDLING MORTALITY IN PLANTATIONS AND SEVERITY OF COMPETITIVE VEGETATION



SELECTED COVER INDEX

SOURCE:
A STUDY OF THE EFFECT OF COMPETING VEGETATION AND BROWSING ON EARLY PLANTATION PERFORMANCE, ROBERT OXENHAM, NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS, TECHNICAL NOTE #5, FEBRUARY, 1983.

be difficult, if not impossible, to justify spending on forest nurseries and the planting program in future. We could not expect the federal government to continue to make a significant contribution to forest management in Nova Scotia. The province and the federal government have already invested some $6 million in a large new nursery at Strathlorne, Inverness County, and over $1 million in a Tree Breeding Centre at Debert, Colchester County. The inability to use registered herbicides when and where required has placed not only these investments, but the future of reforestation, in jeopardy.

Since 50 to 75% of plantations require weeding, we could expect a reduction of at least 50% in our planting success. This would soon lower the sustainable harvest of softwood by at least 331 500 m^3 (150,000 cords) annually. Moreover, since the forest industry utilizes 3 700 000 m^3 (1.7 million cords) of wood annually and employs 8,000 persons directly and another 16,000 indirectly, a serious loss of employment would result from any ban on the use of herbicides.

Timing of Weeding in Natural Stands:

If our productive capacity is to be improved, many naturally regenerated stands need conifer release. Conifers in such stands are initially overtopped by fast-growing shrub and hardwood species, resulting in suppression and/or death. Timely application of herbicides, usually 5 to 10 years after harvesting, would not only reduce the loss of conifer seedling but also increase their growth rate. This reduces the rotation age, increases the softwood yields, and lowers the cost of subsequent forest management operations.

Herbicides are also used occasionally in preparing sites for planting. Many previously harvested or burned over areas --of which we have a large acreage in Nova Scotia--are covered with a dense layer of competing vegetation. To ensure planting success, this vegetation must be controlled prior to planting, either by mechanical or chemical means.

Herbicides offer a cost-effective, efficient and safe means of controlling competing vegetation. Herbicides were used in forest management in Nova Scotia as long ago as 1966 and have been used here continually for the past 8 years. The herbicides used in the forest management program in Nova Scotia are fully registered by the Federal Government and with proper use are considered safe from both human health and environmental standpoints by Federal and Provincial Departments of Health and Environment.

In contrast to their use in agriculture, adequate vegetative control in forestry can normally be achieved with only 1 or 2 treatments of herbicide applied 1 to 5 years after planting. Further applications would then not be required until some 40 to 60 years later, when the stand was harvested and the area replanted. Because of the long period between applications and the fact that many regenerating areas require no treatment, herbicide use in Canadian forestry amounts to less than 1% of herbicide use in Canada annually.

Non-Chemical Weeding:

In most imstances non-chemical hand weeding is neither economical nor practical. In 1982 the cost of hand weeding ranged up to $1200/ha ($500 acre). The cost of applying 2,4-D and 2,4,5-T was approximately $62 to $75/ha ($25 to $30/acre) from the air and $187/ha ($75/acre) from the ground. Moreover, acceptable control of competing vegetation is impossible with only 1 hand-weeding. Because of the suckering and/or sprouting properties of pin cherry, heath vegetation, alders and poplars, maples, raspberries, etc., multiple treatments are normally required.

Another major disadvantage is the increased health hazard associated with using chain saws or hand tools to cut down the competing vegetation. A USDA-EPA assessment team report stated that during 1.4 million man-hours of aerial application of various types of herbicides to brush in Texas, one accident occurred in which a flagger lost the sight of one eye. This was diagnosed as being caused by diesel oil. In Nova Scotia, water rather than diesel oil is used as the carrier. Alternately, brush control on forest land in Oregon by chain saws resulted in 769 accidents per 100,000 man-hours. In hand-clearing operations the rate was 407 accidents per 100,000 man hours.

Magnitude of the Proposed Program:

In 1982, the total projected area requiring herbicide treatment for all forestry uses was 6 000 ha (15,000 acres), or less than 1/6 of 1% of the total productive forest land in Nova Scotia. The use of herbicides in forestry is very minor in comparison to the total acreage of forest land. However, for the reasons summarized above, this minimal use of herbicides is essential to maintaining the viability of Nova Scotia's most important industry.

Other provinces have a similar requirement. Usage in Nova Scotia is in line with the magnitude of the industry and the extent of forest land in the province.

Fears for the Hardwood Resource:

Much of the planting is required in areas that were occupied by mature to overmature balsam fir and white spruce stands. For example, in Victoria and Inverness counties these two species comprise almost 90% of the softwood volume. By planting spruces and various species of pine, the percentage of balsam fir and white spruce in such areas can be gradually decreased. This increases species diversity and reduces the risk of future pest attacks. Moreover, because plantations and other silviculturally treated stands can be harvested 30 to 40 years sooner than can natural unmanaged stands, the average age of the forest can be gradually reduced, thereby increasing its vigor and diversity.

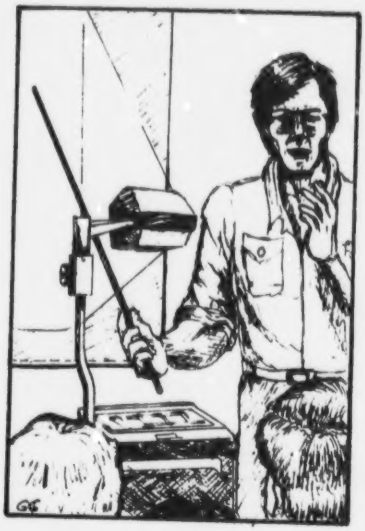
Summary

Protection is a prerequisite of good forest management. Historically, fire has been considered the primary protection problem, so the capability to protect the forest against fire losses has been continually improved over the years. While fire will continue to be a threat, in the last decade losses to insects have greatly exceeded those resulting from fire. Given the conditions, our forests will remain vulnerable to pest attacks for decades.

Plantation surveys and studies confirm that growth and survival of planted seedlings are seriously affected by various species of competing vegetation. Forest plantations need weeding just as urgently as do agricultural crops.

The future viability of the industry depends to a large extent on adequately protecting the forest resource. If everything is left to chance, it is inevitable that we will experience a severe reduction in the magnitude of harvesting and processing. On the other hand, with provision for adequate protection and expansion in reforestation and other silviculture treatments, growth in the sector can be contemplated.

Therefore, the future demands a commitment to all the elements of forest management, including effective protection of our forests from insects and competing vegetation. Left unchecked, these attacks will probably destroy millions of cords of wood. Volume losses of such magnitude cannot be pemitted if we are to maintain the AAC.



9

Education & Training

9. EDUCATION AND TRAINING

Education

Toward An Educated Citizenry:

If one were to ask a Nova Scotian homesteader of 1830 which trees to cut for ship knees, or to enquire of his wife how to identify buckthorn bark for a purgative, or to quiz their children about where to look for snipe eggs, correct answers would not be long in coming. Such facts were everyday knowledge.

To ask an average Nova Scotian family such questions today would be unfair. But we could substitute modern questions: What animal's image appears on the Canadian quarter? Does a nail driven into a tree trunk ascend as the tree grows taller? What economic rank does forestry hold in Nova Scotia? These and a dozen other carefully chosen questions were put to 1,500 Grade VI students in a province-wide survey in 1980. Only 48 percent of the students answered all the questions correctly, and rural children did no better than urban. If the questions were valid, perhaps all educators will have to rethink their definitions of what constitutes a truly educated citizenry, and how best to achieve it.

Role of Department in Education:

The Department of Lands and Forests was created in 1926. For 20 years its educational efforts were limited to occasional talks, field days, film showings, press items and a few pamphlets--mostly as need dictated and its small staff could manage. Forest fire prevention was the overriding concern. With the passage in 1946 of the Small Tree Act, field staff found themselves both explaining and enforcing the Act. Although there were confrontations, the late forties are often cited as a time of exciting progress in public understanding of forestry. In a province where three-fourths of the woodland is privately owned, the success of a new law depends heavily on education.

The next two decades saw the formation of an Extension and Forest Biology Directorate within the Department (1958). Headed by a director, a 16mm motion picture library of films on forest fire prevention and wildlife conservation was built up, with a supervisor and two field projectionists. With help from district staff, selected showings were put on by appointment at each school in the province at least once every two years. An instructor was hired to promote hunter safety by working with volunteer groups throughout the province. A sawmill specialist was put in charge of helping owners of wood-products mills to improve productivity. Five extension foresters with five technicians were hired and stationed in Kentville, Bridgewater, Truro, New Glasgow and Musquodoboit Harbour to promote woodlot management and Christmas tree cultivation. A forester/communicator was taken on to work full-time on developing information materials for staff and public.

Over the next few years these materials included an increased flow of technical and popular publications on forestry and wildlife, an average of one new motion picture a year, a Department logo for use on all correspondence, uniforms, etc., standardized signs marking Department establishments, regular advertising on radio and television, an exhibits program, development of 4-H Forestry handbooks, staff and public newsletters, press clippings and a photographic library.

Through all these means the Department sought to provide good information on forest resources and their management, and to promote good stewardship of those resources. From 1970 onward, all dealings with the media, whether for paid advertising or for press releases, were handled through the then Communications & Information Centre (now a branch of the Department of Government

Services). Only once--for a few years after 1965--did the Department have its own media officer.

Reorganization of Department:

In 1970 the Department was reorganized on a less centralized model. A Forest Resource Manager was set up in each of the eight inventory Subdivisions and made responsible for day-to-day Department activities in the management of parks, Crown land, wildlife, and so on. The five extension foresters and their technicians were placed under them to carry on their work, while the hunter safety, mill improvement and information functions were placed under a new Forest Resource Education Subdivision, directed from Halifax.

The Forest Improvement Act and Education:

In 1965 the Forest Improvement Act, modelled on Swedish forest law, replaced The Small Tree Act. The new legislation called for setting up district boards under a provincial body. Each District board would function in a judicial-educational role in this area, promoting good forest management and resolving forest-related disputes under the Act. (Interestingly, the same idea had been recommended for Nova Scotia 53 years earlier by B. E. Fernow.)

To test the waters, the government decided to make only certain sections (e.g., registration of operators, greenbelts, immaturity) into law, and to do so only in one county. In 1966 the Department sponsored a Chronicle-Herald supplement and held public meetings in Colchester County to explain and promote the Act. Whether due to inadequate publicity or to some other cause, the public was not enamoured of the Act. Although later amended, it has never been fully enforced. Despite its considerable potential for public education, in subsequent years it has fared little better. Apart from producing an attractive manual of forest practices, the provincial board has been mired in controversy much of the time.

Public Criticism of the Forest Industry:

Nonetheless, by 1970 the public was showing increased interest in forestry anyway. In the early sixties a fledgling Nova Scotia Forest Industries launched its "New Forest" promotion effort aimed at selling silviculture to the public and training more forest workers. But CBC Television aired a national "Land and Sea" program criticizing N.S.F.I.'s "4,000-acre clearcut" on the Cape Breton Highlands. (Actually, they were salvaging stands killed by hemlock looper.) At about the same time Scott Maritimes Pulp at Abercrombie Point, Pictou County, began to suffer bad press reports over its effluent disposal at Boat Harbour, its SO_2 emissions and its clearcutting policies. Accusations about pollution were also directed against Bowater-Mersey in Liverpool and Anil Canada at East River.

Unfortunately the forest industry, although it made improvements in problem areas, at no time made a concerted effort to explain and promote its policies on these key issues. When statements were made, the tone was usually defensive. Sometimes it was actually derisive. After all, the critics were still only a vocal minority. And although there were a dozen forestry-related private groups active in the province at that time, none played more than a minor role in education. Perhaps the best such efforts were put forth by the Nova Scotia branch of the Canadian Forestry Association, a non-profit organization which sponsors Abour Day, Smokey Bear materials, poster contests, and forest conservation in general. Nova Scotia's 20-year-old-Association--before it expired for lack of interest in 1980--was funded about equally by industry and government. The Department worked closely with this group.

Budworm Problems:

In the 1970's the spruce budworm situation worsened in the Valley, on the northern mainland, and on the Cape Breton Highlands. New Brunswick's Concerned Parents movement, alarmed by a supposed link between fenetrothion spraying and Reye's Syndrome in children, brought a suit against Forest Protection Limited. In Nova Scotia, the newly formed Cape Breton Landowners Against the Spray presented a large petition to the Minister of Lands and Forests. At the same time, the industry lobbied in vain for aerial spraying of high hazard areas. The noisy debate had all the ingredients of the classic confrontation of reason against emotion, and (at times) ill-informed rhetoric. For the voter it was an especially confusing time. Yet it had the merit of at least forcing the average Nova Scotia citizen to finally pay more heed to forestry. Where decades of polite conservation education had seemingly failed to have much measurable impact, the budworm controversy put forestry on the front page, and even into mealtime talk. At last there was widespread recognition of the connection--long stressed by the Department--between our forest resources and bread on the table.

General Development Agreement:

Meanwhile, the Department, with little fanfare, was assembling personnel and apparatus to implement the most ambitious forest improvement and public awareness program yet seen in Nova Scotia, under the Federal-Provincial Subsidiary Agreement for Forestry. Two significant elements were the setting up of a province-wide staff of foresters, technicans and support personnel, and the provision of $510,000 for education and public information.

By March 31, 1982 some 2,600 landowners had signed into the program, some 200 000 ha were under managment, and an array of educational materials had been prepared. Notable among these are the bi-monthly newsletter Forest Times (circulation 10,000), a series of how-to-brochures on silviculture, slidesets, drama presentations reaching 52,000 high school students, distribution of a comprehensive manual of forest practices (The Trees Around Us), and an expanded program of television advertising to explain forest managment and to improve the forest worker's image.

Current Education Programs:

These activities were incremental to ongoing information and education efforts of the Department, which now included mandatory hunter education, the new Creighton Forest Environment Centre at Shubenacadie, a second wildlife park, increased forest worker training, a quarterly wildlife magazine (N.S. Conservation, circ. 18,306, March 1982), and forestry awareness courses and workshops for public school teachers.

The Department of Lands and Forests now has an information and education program of long standing, reaching over 20,000 readers 10 times a year via its two periodicals; 80,000 school children a year via the film program, posters, coloring sheets, etc.; at least 200,000 people a year via its exhibit centers, hunting and fishing licenses and brochures, parks, extension programs, participation in fairs, etc., not to mention several thousand annually through special mailings, talks, walks, and the answering of mail and telephoned enquiries. If we include contacts made by advertising through the print and electronic media, the Department can truthfully be said to be reaching virtually the whole population each year. And of course there is an ongoing communication with the public through its 30-odd field offices in every county and its more than 500 personnel.

One is tempted to ask: what more needs to be done?

But looking at it from the citizen's perspective quickly dispels any notions of perfection. The impact of even 4 or 5 contacts per annum on any individual among our various publics is really not that great. Even if it were, there are always new developments and altered attitudes to address. The job is never finished. The key question is: How can things be improved?

A Closer Look:

It is clear that the Department has many publics: fishermen, hunters, teachers, mill owners, wood contractors, school children, woodlot owners, weekend woodcutters, truckers and so on. Somehow, we need to try to reach them all regularly, and where possible, provide ways for them to reach us.

It is sometimes suggested that the Department is educating youth at the expense of the adult public. A look at actual programs indicates otherwise. For example, the healthy condition of Nova Scotia's Christmas tree industry is largely due to the work of our extension foresters from the 1950's onward, using field days, talks, and illustration plots. Similarly the groundwork for the success of today's woodlot management programs was laid by the same men. The Department's travelling sawmill exhibit of the 1950's (with demonstrations of actual sawing) did much to promote the wood products industry. In fact, the Department has hardly missed a major agricultural or industrial fair since the 1950's, featuring every year a different concern, from forest protection to chain saw safety. These have been mostly low-budget displays; professional productions might have been more effective.

One of our most important adult publics today is the woodlot owner. The Department's private lands staff and the Forest Times newsletter and other publications have probably reached only the more active and committed landowners--but there is a large population still unreached. Many of those are out-of-province owners. Others are over 50 years of age, and not disposed to embark on long-term management under present market conditions. Yet collectively this group controls 52% of the province's most productive and accessible woodland. Persuading them to activate their woodlands would ease the strain on other sources.

School film personnel have always tried to fulfil requests from parent-teacher associations, rod-and-gun clubs, etc., for evening and summertime showings. In most years these audiences have totalled several thousand. Since the 1960's we have operated a forestry lending library of films and slides. To bolster this library we have in the last 10 years produced several of our own 16mm motion pictures for adult audiences, namely: Chain Saw Safety (with the N.S.F.P.A.), Our Forest Law, A Place For Wildlife, Spruce Budworm, Spring Harvest (on the maple products industry), and Christmas Tree Farming in Nova Scotia. A film on eagles is nearing completion. These films have been shown to or borrowed by wildlife groups, maple producers, woodlot owners and many others. There is a great need for motion pictures, filmstrips and slidesets of local origin, and even outside films are in steady demand. Of necessity, most of our library's 450 16mm prints are of outside origin, and many are old.

Literature too has always played an important part in the Department's overall effort with the adult public. From the Extension Notes and Bulletins of the 1950's onward, topics have been many and varied: use of flagging tape on Christmas trees, moose and deer management, bush survival, forest measurement techniques, maple syrup production, building forest roads and fire ponds, woodlot management, raising pheasants, the Forest Improvement Act, planting, thinning, etc., etc. In all, there have been nearly 200 titles. Some of them, like the Forest Products Directory and Trappers Newsletter, are annual productions. Then there have been the major publications like The Forest Resources of Nova Scotia (1958) and The Trees Around Us (1980).

All these publications have been distributed as fully and freely as staff and funds permitted, sometimes with promotion in the press or in Department newsletters. It is safe to say that in the field of publications we have generally been ahead of our sister provinces. This is proven by the fact that they regularly request and purchase our publications. One disappointment, however, is Management Board's recent decision to suspend our wildlife magazine.

Apart from these activities, the Department's education section has since the early 1970's undertaken special advertising campaigns each year. These are distinct from routine advertising such as tender notices, scalers' schools, job openings and the like, and they have not been much concerned with image-polishing. The main topics have been forest fire, theft of forest products, hunting courtesy and safety, concern for wildlife, and appreciation of the need for forest management and more skilled workers. Advertising, although very expensive, is still our only way of reaching all the people.

And what of youngsters? It would certainly be irresponsible to ignore them. Our school audiences of the 1960's are now young voters. Indeed, some people feel that, since "you can't teach an old dog new tricks", all efforts should be focused on the young. From the beginning the Department has tried to follow a middle course. One of its earliest efforts entailed Junior Guide Schools--summer camps where teen-aged boys learned the use of campfires, cooking, map and compass, axes, canoes and rifles. These camps ran until the late 1960's, when federal youth programs edged them out. Staff has always been encouraged to support Scouting and 4-H activities. The motion picture program reached the remotest schools (and lumber camps) with films on fire prevention, forest management, and wildlife conservation. Bookcovers, coloring sheets and kits of literature were left at each school. Although schools have consolidated and television has come and staff workloads have increased, the film program still reaches over 80,000 young people each year. In addition, teacher training in forestry has been undertaken, and a forestry kit developed for classroom use--both apparently unique in Canada.

Some Questions (and Answers):

This brief history of our efforts in public forestry education would be incomplete without some attempt to reconcile them with today's realities. One might well ask, "With all this activity, why isn't the public more receptive to the demands of modern forest managers?" This question has ramifications extending far beyond the scope of this paper--into the realms of sociology, demography and psychology. Answers can be found in Galbraith's Affluent Society, Ingleharts's The Silent Revolution and Bell's The Coming of Post-Industrial Society, all of which document the drastic changes in public values and expectations since World War II.

But answers can be found closer to home too. In the first place, none of the programs outlined above was expressly designed to counter public criticism, real or anticipated, of the forest industry. That would have been self-defeating. The mandate of a government education and information service, as we conceive it, is broader. It also embraces wildlife, law enforcement, research, recreation, protection and trapping, to name a few. To concentrate on any one is to lose perspective and credibility. Conversely, to carry out an integrated, multi-media program across a spectrum of long-term concerns is to benefit society as a whole. Moreover, this is the kind of thing governments do best. There is nothing to prevent those with special interests to push their concerns if they so wish. It's still a free country. Yet until quite recently industry has been content to shelter under the government educational umbrella--which has never been, and never will be, large enough for everybody.

We can find some answers in agriculture as well. Why is it that forest managers are on the hot seat for wanting to use chemicals, while agrologists seem to have the public's blessing? One reason might be that farming is so directly linked to human survival. We've done it so long, we think it's "natural". It has an aura of righteousness. Yet clearing and plowing a field, drenching it with Atrazine herbicide and then planting corn is, if anything, more disruptive of natural ecosystems than are clearcutting and planting trees with or without herbicides--but the first is acceptable because the benefits are obvious and almost immediate. Most farms are located where we live and travel, and most crops are ready the same year.

Forestry operations have been going on since at least Egyptian times, but tend to be out of the public view. A crop of trees takes 40 or more years to mature; the benefits seem far down the road. Moreover, forestry is often a large-scale enterprise, compared to most farming operations in this region. Bigness in today's society is automatically suspect. Still another factor may be a certain sacred quality which many attach to trees and wilderness. People who will put up with the noise, pollution and danger of modern living seem to take comfort in the thought that in the woods All is Serene. While all this is admirable and necessary, they don't like to be reminded that modern living itself makes very heavy demands on the forest. They forget the links which bind us all to the trees.

Perhaps because of these apparent advantages, agriculture has built up an enviable matrix of information and education activities. At the heart of this is a network of extension personnel or "Ag Reps", dealing directly with farmers and backed by research, marketing and newsletter services, and a provincial agricultural college. An integral part of this effort has been regular radio broadcasts going back some 30 years. These are generated mainly from news and information fed into the central office by field workers.

In contrast, one respected radio journalist has described the Department of Lands and Forests as "traditionally one of the most tight-lipped of government departments". Whatever the truth of this at present, it points to a certain hesitation in dealing with the media, even at senior levels. At field staff levels it has been more like suspicion and fear--sometimes with good cause. The Department is engaged in so many good solid projects which the public knows little or nothing about that arrangements should be made to bring them regularly to its attention. This is not horn-blowing; it is simply good information--what the late resource education expert Douglas Gilbert called "deposits in the bank of public good will". When trouble comes they are invaluable. But it requires the dedicated work of specialists to keep the account in the black.

Should such specialists all be civil servants? Our conviction is that the task of informing the public about forestry is too great a burden for any one agency. In most provinces, including New Brunswick and Newfoundland, it falls more or less equally on public and private shoulders--the private input coming from a branch of the Canadian Forestry Association or equivalent. In Nova Scotia it has long been a Lands and Forests responsibility. While convenient in some respects, this leads to apathy on the part of other agencies, who learn to "let George do it". Also, it leaves the Department open to unfair accusations of bias. Finally, it denies representation to a large segment of the population who, if not forest owners or operators, are still forest users --hunters, fishermen, hikers and others. They pay taxes too, and they deserve input into educational programs that benefit the resource. Otherwise a disproportionate financial burden is placed upon the government.

One problem area that deserves special attention is the lack of local material on forestry--indeed on any of our primary resources--in the public school curriculum. That there is little, is understandable. As late as 1979, according to a study done by the Atlantic Institute of Education, only 3 of 15 major publishers supplying Nova Scotia's elementary schools with approved materials were Canadian--and none were based in Atlantic Canada. The rest were American or British. This in itself is not bad; but when, in Level Four Science, pupils are directed to look at a map of North America with Canada deleted, one begins to wonder. A Social Studies text mentions Haida Indians, but not Micmac or Beothuck.

Attempts at Canadianization often lead to downright misinformation, as when one American textbook describes the poem "In Flanders Fields" as important on "Victoria Day, which later became Armistice Day". Even Canadian-authored textbooks leave much to be desired. Holt, Rinehart & Winston's offering for high school science mentions the spruce budworm--but only as an annoying invasion of the moth affects life in the author's hometown, Toronto. The same publisher offers Canada: A New Geography, a text approved for Grade 9 studies. This attractive book allots some 40 pages apiece to Agriculture and Manufacturing, 8 to fishing...but a scant 4 to forestry. In any case, the spotlight is on British Columbia and Ontario.

Well, the Maritimes are only a small part of Canada. And Nova Scotia is even smaller. To be fair, much of this apparent imbalance stems from the harsh economics of publishing for a limited market. Today few can afford the high unit costs. The last locally written geography text for Atlantic Canada was published by Gage of Toronto in 1961. Though long out of print, Grade 6 teachers still use it.

What this boils down to in terms of forestry awareness--since students care nothing for the economics of publishing--is that it gives the impression that forestry is unimportant. Yet the exact opposite is true. Forestry, we are told, is the nation's biggest single enterprise, bigger than mining, fishing and farming put together. Thus, by omission a very powerful statement is made. Out of sight, out of mind. And, of course, our teachers come out of this same system.

Somehow, forestry must be given at least its rightful place in our public schools and teacher training curricula.

If our small population mitigates against having our own text books, we can at least have our own teaching aids. A start has been made. Ironically, one of the best teaching aids anyone could desire is within reach of every school in the province; namely, our woodlands. Unfortunately, school time is already crowded with activities. This is especially so in high school. In the past, most schools were allowed only one bus trip a year. Whether the new municipal control of such matters will change this, remains to be seen. In any case, forestry need not be an addition to already burdened schedules. Materials are now available (e.g., Project Learning Tree) which utilize forestry concepts in the teaching of mathematics, science and so on. Here indeed is a promising avenue to explore.

Silviculture Training/Forest Worker Level

Background:

With intensive forestry it is necessary to prepare now for the additional workers needed for expanded silvicultural programs. Forest workers will require specialized training, and this is expected to mean the retraining of some of the workers now engaged in harvesting. Training will enable personnel to perform work in a satisfactory and cost-effective manner. Forests For the Future summarizes Canadian concerns, but these are wholly valid for Nova Scotia (CPPA publication, September 1980).

In many forested nations the forest worker achieves a high level of technological skills and his status as a professional in the community is of a very high level. In Canada as a whole, and Nova Scotia in particular, this is not the case. For example, the forest worker in Sweden is well paid, with educational and social status comparable or even higher than that of industrial workers in general. The annual income of the permanently employed forest worker is, on average, higher than that in other trades and industry:

Class of Work	Index
Forest Worker	110
Pulp & Paper	100
Industrial Average	100
Sawmilling	90

The accident rate in forest work is high both in Sweden and in Nova Scotia, in comparison with other occupations. However, judging from available statistical data, the rate of chainsaw accidents per unit volume is more than 6 times higher in Nova Scotia than in Sweden (Hektor, 1974).

In the seventies a shortage of manpower resulted in two of our larger companies undertaking training of new, and upgrading existing workers. In order to accelerate work under the General Development Agreement, the Department of Lands and Forests trained some of the workers for newly emerging silvicultural crews.

Most seasoned workers questioned why they had not had the training sooner, and it was driven home that screening of new workers to determine their suitability for forest work needs to be more rigorous. Also, past training practices clearly indicated the need for standardization.

Although past training efforts were a step in the right direction, there is a need for continuous training and upgrading of skills to keep the professional forest worker up to date. Past training was highly regarded, but a valid criticism was that it was limited in scope and spasmodic in nature. In fact, it reached only a small proportion of the workers who needed it.

Modern Forestry Demands New Skills:

There is an urgent need to take immediate steps toward forest worker professionalism, as ultimately the people who are running the machines and chainsaws are the 'forest managers".

The future of our forests is vitally important--too important to let unskilled workers undertake these silviculture treatments.

A 1980 survey, conducted by the Nova Scotia Forest Products Association, concluded that the following work classifications in the forest industry were in need of training. (Employers who answered the survey reported 1,224 employees, 592 of whom required upgrading through training.)

Work Classification Category	Percentage Requiring Training
Chainsaw Operators (Harvesting)	39%
Skidder Operators	68%
Forwarder Operators	54%
Knuckleboom Operators	57%
Silviculture (Chainsaw operators)	91%

It is significant that 91% of silvicultural workers needed training, reinforcing the views already expressed that neither skills nor know-how have been widely acquired at the worker level.

3-Phase Training Program:

As a result of this survey, a 3-phase forest worker training program has been developed by the Safety and Training Committee of the Nova Scotia Forest Products Association and the Department of Lands and Forests. This was done with the Commercial Safety College in Masstown. CSC is now prepared to offer the course in its entirety. A pilot course of Phase 1 was undertaken in December 1981. Nineteen out of 21 graduated, with 15 finding immediate employment. The course was reviewed and some refinements made.

Phases 2 and 3 will be offered to graduates after 6 months and 1 year of woodswork respectively. The Phase 3 graduate will be recognized as a professional forest worker. In addition, Phases 2 and 3 will be available to woodsworkers who, through woods experience and a skills test, are judged to be able to by-pass Phase 1.

The course outline in detail and evaluation on completion is available.

Now that the forest industry comes under the Industrial Safety Act, employers are obliged to look after an employee's training requirements. Many forestry employers are unable to do this.

Silviculture Training/Supervisory Level

Silviculture is still a relatively new field in Nova Scotia and in light of inevitable technological changes, it needs to be clearly recognized that there is an urgency to upgrade skills at all working levels.

Although past training efforts were a step in the right direction, there is a need for a continuous in-service training program for all supervisory staff, within Lands and Forests and private companies who make silviculture prescriptions and check on-going and completed work. Such a program has recently been initiated by the Department of Lands and

Forests and needs to be continued in the future. Training provided under this program will help ensure that the practical results from research and other technical programs are put into practice. This course of action will ultimately result in an increase in the quality and quantity of products derived from the forest.

Summary:

During a long association with the forest resource, Nova Scotians have moved from a day-to-day familiarity (which sometimes bred contempt) to a kind of remoteness which breeds indifference on the one hand and Nature worship on the other. Yet our dependence on the forest is, if anything, greater than ever. This is the dilemma which forest managers face, and educators face it with them.

Since 1926 the Department of Lands & Forests, as the legal custodian of this resource, has attempted with legislation and persuasion to coax landowners and the general public to practise good forest stewardship. By and large it has been as successful in this as any other provincial government forestry department. But there were problems. The forest had suffered some hard use. Fire was still a constant threat. Demands were increasing and markets changing. Data was scanty.

The Department's early education efforts focused on fire prevention, good woodlot management and Christmas tree and maple syrup production. Gradually it built up an integrated program, firstly to service the varied needs of its special publics, and secondly to educate the general public. But in the late 1960's a new kind of public emerged, less concerned with security than were their parents who endured the Depression, and more devoted to enhancing quality of life. When in the early 1970's an irruption of pests forced forest managers to think of drastic protective measures, vocal minorities well schooled in ecotactics protested loudly, calling into question the integrity of forest development to that point and threatening the future of the industry. In the midst of this the Province embarked on an ambitious cost-shared forest managment program to improve its forest estate and to create a new awareness of the needs.

One of those needs, that of skilled workers to carry out the necessary silvicultural treatments, has been becoming more acute since the 1970's. Compared to his counterparts in forested European nations, the Nova Scotia forest worker is very low on the social scale. Not only is he paid accordingly, but statistics show that he suffers up to six times as many accidents. Department staff has been endeavoring to change this. Pilot courses have shown dramatic improvements in worker output and safety. Now, working with industry, the Department has helped develop a 3-phase comprehensive training program that shows great promise.

The recent Subsidiary Agreement for Forestry has had a big impact on the need for silvicultural training. The new Forest Resource Development Agreement will increase this need many-fold.

Silviculture is labour-intensive, and although crews have sprung up, basic skills are lacking. Gains through skill training can be broken down into 4 parts:

Production increases
Accident reduction
Image Improvement
Forest quality upgrading

Image improvement is hard to measure, but very real. All add up to professionalism and stability in the industry.

10

Supporting Legislation & Funding Arrangements

10. SUPPORTING LEGISLATION & FUNDING ARRANGEMENTS

Under the British North America Act the provinces have the primary responsibility for the development, conservation and management of the forests. Nova Scotia has discharged its responsibilities over the years under the powers granted the Minister by virtue of the Lands and Forests Act of 1926, as amended, and more recent statutes such as The Forest Improvement Act and The Pulpwood Marketing Act.

Federal responsibilities are defined as being mainly in support of provincial programs. These include the promotion of Canadian forest products exports, ensuring a positive economic and regulatory climate for new investment, maintaining forestry research and development, supporting provincial forest renewal programs and the provision of national and international forestry statistics. The most significant federal statute is the Canada Forestry Development and Research Act of 1960, as amended.

Federal/Provincial responsibilities are reflected and refined in the recently signed Forest Resource Development Agreement and the Memorandum of Understanding Concerning the Coordination of Forest Research. The responsibilities of the two levels of government are, by and large, compatible and complementary.

The Department of Lands and Forests has developed the capability to conduct various programs over the years, operating from the facilities described briefly in the Introduction. Trained personnel are now employed to implement forestry programs on public and private lands, conduct forest research, operate nurseries and a tree breeding centre, maintain the forest fire detection and suppression program and carry on related activities in forest managment throughout the province.

Provincial Statutes

The responsibilities, structure and functions of the Department of Lands and Forests and the various statutes that are administered by the Minister and the Department were described briefly in the Introduction. As indicated in that section of this report, several statutes impact directly on the forestry sector in Nova Scotia, including the Lands and Forests Act and the Forest Improvement Act.

The Lands and Forests Act provides for the management of Crown lands, the protection of the forests and various related matters while the Forest Improvement Act makes provision for the regulation of forestry activities on private lands. For various reasons, including perceived difficulties in implementation, this statute was not fully proclaimed until 1976.

It has become obvious that some of the statutes under which the Province, through the Department of Lands and Forests, discharges its responsibilities, particularly with respect to the forest resources, are in need of review, updating, and consolidation. A full review of the relevant statutes may be warranted to ensure that they are appropriate for present and perceived future needs, to eliminate inconsistencies, clarify respsonsibilities and streamline administrative procedures. For example:

- The Land Holdings Disclosure Act is not working and is evidently unworkable. This statute should be amended to make it effective or it should be removed.

- The Lands and Forest Act is not adequate for present day and perceived future forest managment needs and should be completely reviewed and updated.

- The Forest Improvement Act has appeared as something of a conundrum. While there can be no quarrel with the principles involved, there is considerable disagreement, if not confusion, over how these principles will be served. The statute was developed in the mid-1960's and has been overtaken by various advances in the past 10 years or so. Review and updating in conjunction with other forestry legislation would appear timely.

- The Scalers Act is considered to be inadequate to present and perceived future scaling needs in the province.

Federal/Provincial Funding Agreements

While the Province has provided the personnel, facilities, equipment and a base of forest development funding, much of the thrust in intensive forest management has been derived from federal/provincial funding agreements.

Since the passage of the Canada Forestry Act of 1949 the federal government has had the authority to enter into financial assistance agreements with the provinces. During the 1950's and early 1960's composite forestry agreements were ratified with all provinces. These were supplemented from time to time by special forestry agreements. During this period, Nova Scotia received some $1.5 million in federal composite agreement funds, for the completion of a provincial forest inventory and other forestry work, and $0.7 million in special agreement funds, used to provide employment for unemployed coal miners on Cape Breton Island. The eligible activity under the latter was stand improvement work. The composite agreements were administered by the provinces while the special agreements were administered by the Canadian Forestry Service.

Funding under the composite agreements terminated in 1967, marking an end to a period of systematic funding of forest sector activities by the federal government. This was followed by a period of incidental forestry expenditures under the Agricultural and Rural Development Act (ARDA) of 1962. Nova Scotia received in excess of $3 million in federal funding for forestry work under ARDA, matched by provincial funding of at least an equal amount. This combined funding was used for access road construction, boundary line work, stand improvement and reforestation on both Crown and private lands, land acquisition and some related staffing costs. ARDA funds ceased on Mar. 31/76.

In 1974 Nova Scotia concluded a 10 year General Development Agreement (GDA) with the federal government through the Department of Regional Economic Expansion (DREE). This enabled Nova Scotia to negotiate subsidiary agreements covering development funding for various sectors including forestry. These subsidiary agreements were to be cost-shared and were to be implemented by a provincial department or agency.

In Nova Scotia, preliminary proposals for a forestry agreement were developed as early as 1974. However, for various reasons the Subsidiary Agreement for Forestry was not signed until June 28/77. This took the form of a 5 year agreement expiring on Mar. 31/82, providing joint funding of $25.6 million of which federal contributions totalled $20.2 million.

This agreement was amended in July 1978 when Canada Works funds became available for wood salvage/storage and related forest management efforts and again in February, 1980 when the responsibility for the Canada Works amendment was transferred to DREE, effective April 1/79. The result of these amendments was an increase in funding to a total of $57.8 million of which DREE was to fund $34.8 million and Canada Employment and Immigration Commission $1.3 million (for the Canada Works portion in 1978). This meant that Nova Scotia was required to fund $21.6 million, or 37.5% of the total program. In addition, the Nova Scotia Department of Lands and Forests, as the implementing agency, was required to provide the staff, office facilities, vehicles and equipment to carry out this ambitious program. Amongst other things, the Department immediately engaged 30 foresters and forest technicians to deliver the private lands program in the field. If all implementation costs are counted the cost-sharing ratio is estimated at 55/45 federal/provincial. Nevertheless, this comprehensive program of forest management for Nova Scotia would not have existed without the very substantial federal assistance.

The Subsidiary Agreement of Forestry:

The objectives specified in the Subsidiary Agreement are:

- to maintain the existing aggregate employment based mainly on the softwood species; and,
- to increase employment opportunities and incomes in timber harvesting and processing based mainly on the hardwood species.

By the termination date (Mar 31/82) this large agreement had been fully implemented and the objectives had been achieved. Program elements and funding allocations are:

- Forest Management on Private lands
  All of the objectives of this project were met or surpassed. Silviculture treatments, road construction and boundary line work on some 2,600 woodlots as well as incentives for the larger owners to expand silviculture activities.

Total funding (DREE 80%)	$14,114,010

- Forest Management on Crown Lands
  Forest Improvement work on Crown lands and construction of the Tree Breeding Centre at Debert.

Total Funding (DREE 80%)	$ 6,730,392

- Spruce Budworm Salvage (Roads)
  Improved access to stands on the Cape Breton Highlands requiring salvage - maximum of 50% of the cost of incremental expenditures on such roads.

Total Funding (DREE 80%)	$ 1,078,822

- Group Management of Private Lands
  This project funded the organization and operational expenditures of 8 group management ventures.

  Total Funding (DREE 80%) $ 1,766,425

- Wood Salvage/Storage
  The wood storage component of this project was discussed in some detail in Chapter 5. During the life of the project some 1 100 000 m^3 (500,000 cords) of budworm salvaged wood were placed in storage.

  In addition, this project funded the development of the Strathlorne Forest Nursery complex. Supplementary funding for forest management on private lands and Crown lands in the 7 eastern counties was also provided.

  Total Funding (DREE 50%) $29,010,494

- New Uses for Hardwoods
  Mainly research and development work - data collection and analysis on hardwood growth and yield for future management purposes and an investigation of hardwood markets.

  Total Funding (DREE 50%) $ 315,143

- Sawmill Improvement
  This project provided incentive grants to eleven sawmills to encourage the adoption of improved technology and better safety and working conditions. Grants were to offset lower productivity during the learning phase.

  Total Funding (DREE 80%) $ 449,500

- Forest Inventory Refinements
  Funding for improvements to the on-going provincial forest inventory.

  Total Funding (DREE 50%) $ 389,357

- Organization of Forest Management Crews
  Support for the organization and equipping of some 40 silviculture crews.

  Total Funding (DREE 80%) $ 116,500

- Establishment of Consulting Foresters
  Sponsorship for two independent consulting foresters to help implement the private land management project.

  Total Funding (DREE 80%) $ 30,748

- Survey of Private Ownership Characteristics
  Funding for the private woodland owner survey, the results of which were discussed in Chapter 3.

  Total Funding (DREE 50%) $ 9,149

- Education and Public Information
  Program concentrating on explaining forest management through various mediums and providing technical information on the agreement.

  Total Funding (DREE 80%) $ 509,870

- Evaluation
  Funding for an independent evaluation of the Agreement and the development of a forest management information system.

  Total Funding (DREE 80%) $ 124,843

- Wood Salvage/Storage & Ancillary Forest Management
  The funding for the wood storage project in 1978 with Canada Works funding.

  Total Funding (CIEC $1,343,000) $ 3,195,534

Forest Resource Development Agreement:

This agreement, to be effective on the expiry of the Subsidiary Agreement, was signed on August 31/82. The delay in signing was due primarily to organizational changes involving several federal government departments with responsibilities in regional and resource development. As a result of these changes, the responsibility for forestry agreements was assumed by Canada Department of the Environment.

The Forest Resource Development Agreement stipulates two objectives:

- To encourage and support forest managment for the purpose of endeavoring to increase the sustainable supply of softwoods to an average of 3 300 000 m^3 annually from the forest resource to help ensure the continued viability and competitiveness of the present wood-based industry.
- To improve and increase the utliziation of the forest to enhance future forest industry development opportunities.

This agreement specifies total funding of $53.4 million of which Canada is to provide $28.4 million and Nova Scotia $25.0 million.

The thrust of the new agreement is clearly in support of more intensive management of the resource. In this respect it is not dissimilar from the Subsidiary Agreement.

However, the new agreement calls for direct delivery of certain elements by the federal government (through the Canadian Forestry Service) and complementary activities by Nova Scotia (through the Department of Lands and Forests). The direct delivery aspect is a distinct departure from the cost-shared approach taken under the Subsidiary Agreement. However, it is important to note that the Province must maintain the program delivery and implementation capability for all projects, including the Private Land project funded by Canada.

The elements contained in the new agreement and the responsibility for funding are:

- Forest Renewal on Private Lands
  Funding for silviculture, access roads and related improvements on small private holdings, with plans provided or approved by Department of Lands and Forests, and incentives for silviculture for larger ownerships.

  Funded by Canada $27,800,000

- Forest Renewal on Crown Lands
  Incentives to long term license holders for silviculture; access road construction and silviculture on Crown lands.

  Funded by Nova Scotia $21,000,000

- Forest Industry Development
  Incentive assistance to forest product mills to have productivity assessments preformed on their facilities and an investigation of new technologies and new markets.

  Funded by Nova Scotia $ 500,000

- Group Management Ventures
  Continued support for the operation of the 8 group management ventures.

  Funded by Nova Scotia $ 3,000,000

- Public Information and Education
  A comprehensive program of forestry education and information.

  Funded equally by Nova Scotia and Canada $ 1,000,000

- Evaluation
  Evaluation of the Agreement.

  Funded Equally by Nova Scotia and Canada $ 126,000

If implemented as envisioned, with the cooperation of land owners and industry, this Agreement has the potential to stimulate a level of silviculture sufficient to sustain the AAC at a level commensurate with industrial requirements for the next 5 years. It does not provide any indication of what will happen after March 31, 1987.

Summary

Under the British North America Act the Province has the primary responsibility for the development, conservation and management of the forests. The Province has discharged these responsibilities over the years primarily under the powers granted the Minister by virtue of the Lands and Forests Act of 1926, as amended. Additional responsibilities are stipulated in more recent statutes such as The Forest Improvement Act, and The Pulpwood Marketing Act.

The Department of Lands and Forests has developed the capability to conduct various programs over the years, operating from the facilities described briefly in the Introduction. Trained personnel are now employed to implement forestry programs on public and private lands, conduct forest research, operate nurseries and a tree breeding centre, maintain the forest fire detection and suppression program and carry on related activities in forest management throughout the province.

It has become obvious that some of the statutes under which the Province, through the Department of Lands and Forests, discharges its responsibilities, particularly with respect to the forest resources, are in need of review, updating, and consolidation. A full review of the relevant statutes may be warranted to ensure that they are appropriate for present and perceived future needs, to eliminate inconsistencies, clarify responsibilities and streamline administrative procedures.

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11

Summary & Conclusions

11. SUMMARY & CONCLUSIONS

Background

For climatic and geological reasons Nova Scotia has an unusually diverse forest for its area, ranging from extensive tracts of sub-arctic spruce-fir-birch on the Cape Breton Highlands and along its coasts, to temperate deciduous species on its interior lowlands, and a great variety of intermixtures. This diverse forest, despite two centuries of use and abuse, chiefly through landclearing, shipbuilding, lumbering and pulpwood harvesting, and despite the harmful effects of wildfire and pests, remains reasonably productive.

With the setting up in 1926 of a Department of Lands and Forests, and the promulgation of an Act by the same name to control cutting and to prevent wildfire, the stage was set for a more progressive use of the resource.

After World War II forest managers were quick to take advantage of the wartime technologies of radio communications, aircraft patrol and aerial photography. Greatly improved forest fire control and forest inventory methods resulted.

In the late 1960's 3 new fibre mills were established to utilize surplus wood. During the same period the Small Tree Act of 1946 was replaced by the Forest Improvement Act--although the latter was never fully implemented. In the early 1970's spruce budworm inflights from New Brunswick, followed by massive population buildups and damage in certain areas, brought on confrontations among forest managers, politicians and environmentalists over what to do. This debate continues.

In 1962, 1977 and 1982, federal-provincial forestry agreements made possible cost-shared programs for the management and rehabilitation of the resource.

Nova Scotia Forest Resources

This section presented the state of resource as it now stands, or, in the case of Cape Breton, as it was prior to the budworm outbreak. The data clearly reveal some of the problem areas; the age class inbalance; the relatively high mortality; large areas of understocked stands and ownership barriers. These data suggest the reasons for the budworm problem in Cape Breton, namely an old forest with a very high proportion of susceptible species.

In terms of volume, area, ownership and region, generally speaking the problems are universal, with all ownerships and regions needing the same attention. The exception is Cape Breton, whose problems and forest structure will be changed when the current spruce budworm infestation has run its course and the ultimate extent of the loss is reflected in new data.

Much of the present forest is prone to insect and disease damage and blowdown. The vulnerability of the forests in eastern Nova Scotia in particular has become increasingly evident over the past 6 years.

Softwood stands are yielding only 25% of their potential indicating the need for increased emphasis on silviculture requirements.

Forest Land Ownership & Tenure

The commitments made on Crown lands, land acquisition, possessory claims, the role of Crown lands in forest industry development and the uncertainies associated with private ownership have been examined.

Three methods have been employed in allocating the Crown land harvest:

- Long term license agreements with pulp and paper companies:
- License agreements under Section 79A of the Lands and Forests Act:
- Direct management by the Department of Lands and Forests (tender sales, permits, etc.)

There are two long term license agreements with pulp and paper companies. These agreements were negotiated at the time the mills were established. Together, they commit 38% of the wood requirements of the mills involved.

License agreements under Section 79A of the Lands and Forests Act have been negotiated with several sawmills and a hardboard mill since 1974.

The remaining Crown lands are under direct management by the Department.

While comprising less than one-quarter of the productive forest lands in Nova Scotia, Crown Lands have been a significant factor in forest industry development. The allocation of the Crown land harvest has been very significant in terms of industrial development, employment and incomes, as well as in terms of forest management on all ownerships. However, existing commitments on Crown land will require most of the harvest from the larger blocks in future.

The Department has been acquiring forest land by purchase since 1937. Over the years approximately 400 000 ha (1 million acres) of land have been acquired. These lands have contributed significantly to industrial development efforts.

There are about 121 000 ha (300,000 acres) of land where the Crown's title is in question. These lands were never granted but are believed to be subject to possessory claims. The procedure for settling claims is expensive and time consuming.

While it is assumed that the larger private ownerships are likely to continue to contribute to the forest harvest in future, the smaller ownerships present particular difficulties in estimating the future availability of wood. Based on an analysis of recent survey data, it is suggested that the available land in the small private category should be estimated at 60% of the total, or roughly 1 300 000 ha (3.2 million acres).

Difficulties in locating many privately owned properties on the ground and lack of attention to boundary line maintenance over the years further complicate the management of privately owned land.

Competing land uses, such as urbanization, farming and transmission corridors will cause some erosion of the forest land base in future.

Forest Industries of Nova Scotia

The forest resources of Nova Scotia support a well developed and varied forest industry. Currently, with a labour force in excess of 8,000 direct and an estimated 16,000 indirect jobs, the industry produces a wide range of products; namely pulp, newsprint, paperboard, hardboard and various lumber products. This is accomplished through utilization of an annual harvest exceeding 3 700 000 m^3. In addition, the province produces approximately 1.6 million Christmas trees and over 42,000 litres of maple syrup annually. These latter activities require a labour input roughly equivalent to 250 full-time forestry-related jobs.

Total shipments are now valued at more than $500 million annually. However, given the present status of the resource, serious problems may be encountered in maintaining recent production and employment levels.

The softwood sawlog component in the growing stock is more or less in line with annual sawmill requirements. However, the independent sawmills collectively control a relatively insignificant proportion of forest land in the province, leaving them largely dependent on pulp and paper companies, Provincial Crown and woodlot owners for most of their raw material requirements. Moreover, spruce budworm losses, in Cumberland County in particular, may seriously reduce the supply of sawlogs.

Alternatively, the hardwood species afford very limited potential for expansion in sawmilling, given the obvious quality constraints.

The pulp and paper segment is also faced with serious supply constraints. The bleak supply picture is compounded by the continued catastrophic losses as a result of the spruce budworm infestation. To maintain existing production levels, Nova Scotia Forest Industries must find a means to use significantly more hardwoods in the near future. Moreover, supply problems in eastern Nova Scotia will have an adverse impact on central and western regions where expansion might otherwise be feasible.

On the other hand, considerable growth in production and export of Christmas trees appears feasible. Industry spokesmen suggest that a four-to-fivefold expansion over the next 5 to 10 years may be realistic. Expansion in Christmas tree production will be primarily dependent on the availability of export markets and a quality product.

Forest residues may have potential for energy applications, possibly direct combustion in industrial or institutional uses. This potential has not yet been fully explored.

Thus, the overriding concern in the forestry sector is the future raw material supply for pulp, paper and sawn products in order to retain the very significant benefits accruing to the province. Silviculture programs, such as those stimulated by the Subsidiary Agreement for Forestry and being continued under the Canada/Nova Scotia Forest Resource Development Agreement, can dramatically improve the supply picture if maintained at an adequate level.

Forest Production

In the past 20 years the annual industrial harvest has increased by 58% to an average of 3.91 million m^3 (1.77 million cords) in the 1977-81 period. Over 90% of the industrial harvest is in the softwood species. On this basis it is evident that existing industry requires a minimum of 3 300 000 m^3 (1.5 million cords) of softwood and 442 000 m^3 (200,000 cords) of hardwood annually to operate at close to capacity. The forests of Nova Scotia now yield an annual industrial harvest of approximately 1.1 m^3/ha, ranking third amongst the provinces.

Hardwoods have never been heavily utilized. Their largest recorded harvest occurred in 1980 when 523 000 m^3 (230,000 cords) were used, representing a high of 12% of the overall harvest.

The harvest on the small private ownerships declined in the 1969-71 period but has remained fairly constant since then. Over the past decade, it has represented approximately 40% of the total harvest, down from 60% of a much smaller harvest in the 1967-71 period. Production from the large private ownerships has increased significantly since 1967, in line with increased industrial capacity. The Crown land harvest has increased to 23% of the total, reflecting commitments made in conjunction with new and/or expanded industries.

If we compare the relative market share of each of the major ownership categories, it is noted that the small private share is in line with presumed availability, the large private share exceeds the proportion of land owned, and the Crown land share is less.

Concerning the effect of the wood storage program in Cape Breton, it is noted that the impact on the small private ownerships in the seven eastern counties has been even more favourable than anticipated. It is also observed that the harvest on Crown land has been significantly less than the commitment under the Nova Scotia Pulp Limited Agreement Act.

In future, other removals, particularly fuelwood, may compete with industrial users for an increasingly scarce resource. At present, however, there is no mechanism in place to monitor the fuelwood harvest, although such data are required to accurately forecast the availability of the resource. Therefore, it is suggested that some means of regularly gathering fuelwood harvest data be developed.

Insects and Diseases

The spruce budworm is Nova Scotia's number one forest pest problem. Estimated losses to date in Cape Breton and Cumberland county are 24 000 000 m^3 (11.0 million cords). This loss does not include (i) the considerable volume of weakened spruce and fir expected to die in the near future, and (ii) the living merchantable softwood and hardwood volume rendered uneconomic to harvest because it occurs in stands with a high component of dead or otherwise unmerchantable or unsalvagable stems.

A salvage program, initiated on Cape Breton Island in 1977 and accelerated in 1978 when the Subsidiary Agreement for Forestry was amended, provided for the slavage and storage of approximately 1 104 000 m^3 (500,000 cords). An estimated additional 2 200 000 m^3 (1.0 million cords) were salvaged and forwarded directly to the mill.

To date protection efforts have been limited to the application of **Bacillus thuringiensis kurstaki** (B.t.k.). This has been confined to a small percentage of the total area infested, primarily because much of the area where the mortality has occurred could no longer be effectively protected when B.t.k. was first used operationally.

Besides the budworm there are many other insects and diseases which do or may cause significant damage, including the spruce bark beetle, birch dieback, white pine blister rust, the hemlock looper, eastern larch beetle, forest tent caterpillar and the tussock moth. The gypsy moth, a newcomer to the forests of Nova Scotia, has the potential of causing serious damage, especially to the hardwood forests.

Forest Management

The need for an intensive forest management program to sustain and improve the productivity, quality and diversity of the forest has been recognized by all sectors of the forest community. The annual harvest and the forest industries of Nova Scotia are dependent on such a program. Wood supply analyses indicate that in the absence of silviculture inputs the sustainable harvest for softwoods would be 2 400 000 m^3 (1,077,000 cords). Since the industry requires 3 300 000 m^3 (1,500,000 cords) of softwood annually to operate at near capacity, the reduction in harvest would result in the loss of as many as 3000 direct jobs and 6000 indirect jobs.

On the other hand, continued investment in silviculture at the levels specified in the recently signed 5-year Forest Resource Development Agreement will permit the present level of harvest and jobs to be maintained. This statement is true only if losses to injurious agents do not exceed the estimate. Failure to maintain these silviculture treatments at or about the current level will mean a corresponding reduction in the AAC. In addition to maintaining productivity, the present silviculture program provides the opportunity to significantly improve the age class distribution and the quality and diversity of the forests.

A doubling of the present silviculture program will permit the harvest of both softwood and hardwood to be increased immediately by 20% and 50% respectively. Beyond 1986, continued investment will permit the annual harvest to be further increased to 5 500 000 m^3 (2.5 million cords) of softwood and 2 420 000 m^3 (1.1 million cords) of hardwood by the year 2020.

Expanding the forest industry to utilize the expanded supply of softwood and hardwood directly attributable to silviculture investment provides significant employment opportunities within the next 5-year period. Beyond 1987, direct employment could be further increased.

The need for a forest research effort commensurate with the magnitude of this forest management program is outlined. The primary requirement is the capability to undertake shorter term problem-solving research to obtain results that can be integrated quickly into the forest management effort. It is proposed that this can be done most effectively on a cooperative basis with industry, landowners and the federal government.

The forest management planning process is outlined, including the methods to be employed on Crown lands to ensure that forest management inputs are planned within an appropriate framework and to integrate wildlife and recreation interests.

The need for incentives is also outlined. It is clearly necessary to stimulate the greatest degree of private sector interest and participation consistent with forest management objectives, and to structure incentives to achieve this.

Forest Protection

Protection is a prerequisite of good forest management. Historically, fire has been considered the primary protection problem so the capability to protect the forest against fire losses has been continually improved over the years. While fire will continue to be a threat, in the last decade losses to insects have exceeded those resulting from fire.

Plantation surveys and studies confirm that growth and survival of planted seedlings are seriously affected by various species of competing vegetation. Forest plantations need weeding just as urgently as do agriculture crops.

The future viability of the industry depends to a large extent on protection of the forest resource. If everything is left to chance, it is inevitable that we will experience a severe reduction in the magnitude of harvesting and processing. On the other hand, with provision for adequate protection and expansion in reforestation and other silviculture treatments, growth in the sector can be contemplated.

Therefore, the future demands a commitment to all the elements of forest management, including effective protection of our forests from insects and competing vegetation, if we are to maintain the AAC - let alone expand.

Education and Training

During a long association with the forest resource, Nova Scotians have moved from a day-to-day familarity (which sometimes bred contempt) to a kind of remoteness which breeds indifference on the one hand and Nature worship on the other. Yet our dependence on the forest is, if anything, greater than ever. This is the dilemma which forest managers face, and educators face it with them.

Since 1926 the Department of Lands & Forests, as the legal custodian of this resource, has attempted with legislation and persuasion to coax landowners and the general public to practise good forest stewardship. By and large it has been as successful in this as any other provincial government forestry department. But there were problems. The forest had suffered some hard use. Fire was still a constant threat.

Demands were increasing and markets changing. Data was scanty.

The Department's early education efforts focused on fire prevention, good woodlot management and Christmas tree and maple syrup production. Gradually it built up an integrated program, firstly to service the varied needs of its special publics, and secondly to educate the general public. But in the late 1960's a new kind of public emerged, less concerned with security than were their parents who endured the Depression, and more devoted to enhancing quality of life. When in the early 1970's an irruption of pests forced forest managers to think of drastic protective measures, vocal minorities, well schooled in ecotactics protested loudly, calling into question the integrity of forest development to that point and threatening the future of the industry. In the midst of this the Province embarked on an ambitious cost-shared forest managment program to improve its forest estate and to create a new awareness of the needs.

One of those needs, that of skilled workers to carry out the necessary silvicultural treatments, has been becoming more acute since the 1970's. Compared to his counterparts in forested European nations, the Nova Scotia forest worker is very low on the social scale. Not only is he paid accordingly, but statititics show that he suffers up to six times as many accidents. Department staff has been endeavoring to change this. Pilot courses have shown dramatic improvements in worker output and safety. Now, working with industry, the Department has helped develop a 3-phase comprehensive training program that shows great promise.

The recent Subsidiary Agreement for Forestry has had a big impact on the need for silvicultural training. The new Forest Resource Development Agreement will increase this need many-fold.

Silviculture is labour-intensive, and although crews have sprung up, basic skills are lacking. Gains through skill training can be broken done into 4 parts:

Production increases
Accident reduction
Image Improvement
Forest quality upgrading

Image improvement is hard to measure, but very real. All add up to professionalism and stability in the industry.

Supporting Legislation & Funding Arrangements

Under the British North America Act the Province has the primary responsibility for the development, conservation and management of the forests. The Province has discharged these responsibilities over the years primarily under the powers granted the Minister by virtue of the Lands and Forests Act of 1926, as amended. Additional responsibilities are stipulated in more recent statutes such as The Forest Improvement Act, and The Pulpwood Marketing Act.

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APPENDICES

APPENDIX I

CONVERSION FACTORS

m^3 x 0.4527 = cords

m^3 x 35.314 = cubic feet

m^3/ha x 0.1832 = cords/acre

m^3/ha x 14.291 = cubic feet/acre

m^3 x 177 = fbm (logs)

ha x 2.47 = acres

All cubic metres are solid wood except where "stacked" appears in brackets. Stacked is to cubic metres as cords are to cubic feet in the Imperial System.

APPENDIX II

SCENARIO ASSUMPTIONS

Scenario 1

1. 50% private participation
2. 15% cull + waste
3. 10% inaccessibility (topographic)
4. Stands less than 60% stocked were not eligible for harvesting.
5. 10% allowance for greenbelts
6. Variable percentage loss for abnormal softwood losses to future insects, diseases, blowdown and fire:

Subdivision

Cape Breton	- 40%
Eastern	- 34%
N. Central	- 24%
S. Central	- 18%
Valley	- 16%
S. West	- 12%
S. Shore	- 10%

Percentage loss figures were obtained by:

1. Determining the percentage of white spruce and balsam fir in each Subdivision. The percentage was obtained by dividing the sum

of the gross merchantable volume of white spruce and balsam fir by the total gross merchantable volume for all species in the Subdivision, and multiplying the result by 100.

Percentages are as follows:

Subdivision

Cape Breton - 48%
Eastern - 41%
N. Central - 30%
S. Central - 22%
Valley - 20%
S. West - 14%
S. Shore - 11%

2. Based on aerial and ground surveys, it is projected that 40% of the remaining gross merchantable volume of softwood in Cape Breton will not be harvested or salvaged because:

   (i) the standing wood has decayed beyond acceptable levels, and/or

   (ii) the dead or dying timber has blown down and is too rotten or too expensive to salvage, and/or

   (iii) the percentage of salvageable volume in dead or dying stands is so small that harvest is not economical.

   Assuming that the future loss in a given Subdivision is directly related to the percentage of white spruce and balsam fir in that Subdivision and is proportional to the loss in Cape Breton; then 1% wS + bF will reduce the AAC for softwood by .83%.

Scenario 3

1. 75% small private participation in 7 Eastern counties 60% small private participation in remainder of province.
2. 15% cull and waste.
3. 10% inacccessibility.
4. Stands less than 60% stocked were not eligible for harvesting.
5. Combined investment in silviculture by all agencies (1982-87) = double the 1981-82 level.
6. Variable percentage loss for abnormal softwood losses to future insects, diseases and blowdown as follows:

Subdivision	
Cape Breton	- 20%
Eastern	- 17%
N. Central	- 12%
S. Central	- 9&
Valley	- 8%
S. West	- 6%
S. Shore	- 5%

Percentage loss figures were obtained as in Scenario 1, with the exception that the projected loss in Cape Breton was projected at 20% rather than 40%. Hence 1% wS + bF will reduce the AAC for softwood by .415% rather than .83%.

Scenario 2

The Allowable Annual Cut for Softwood was determined by interpolation between Scenarios 1 and 3. Because of the lack of funds spent on managing hardwoods under this Scenario, the AAC for hardwood remained the same as for Scenario 1.

Part 2

Wildlife & Forestry

"Among birds, beasts, insects and all growing things there is a relationship that is close and undeniable; an interdependenence that is inescapable; a balance as precarious as it is essential. Man himself is part of the relationship, though he may consider himself above it. He is still a part of the animal kingdom, still a creature of nature, disciplined by its laws, subject to its influences, depending upon it for his very existence. He could not deny this alliance even if he would; nor can he escape its prescripts. His union with nature, especially with the forest, is irrefutable. It is not only physical but spiritual. All men, living no matter where, rely in some measure, direct or indirect, upon the forest."

A Walk in the Forest
(The Canadian Pulp and Paper Association)

1. INTRODUCTION

The variety and abundance of forest wildlife is a direct reflection of forest diversity: that is, the mix of plant communities within the forests. All stages of forest growth, from sunlit clearings with emerging seedlings to mature stands of towering trees, are used by some wildlife species. Each animal has differing food, cover, water and space requirements. The more varied the forests, therefore, the greater the numbers and kinds of wildlife to be found in them.

Present forest habitat conditions for wildlife in Nova Scotia result in part from decisions made in years past, decisions based on the need to clear land, build settlements, raise crops, and produce timber for ship-building, lumber and, since the 1920's, wood fibre. Fires and pest introductions have also played a part. Forestry programs in the past did not give much, if any, consideration to forest wildlife habitat. The reason, as pointed out by Telfer and Dauphine (1981), is not because "foresters have deliberately excluded it, but that they saw no good reason to include it. Why produce wildlife when there is no appreciation of wildlife values or benefits?"

Recently, increased awareness of ecological matters has focussed public attention on the multiple-use concept for managing resources and integrating wildlife management with forestry practices. This brief presents a short review of the history and development of wildlife conservation in Nova Scotia, public attitudes towards wildlife, wildlife values, wildlife jurisdiction, and emphasizes the need to promote policies and establish goals for forest management in the province which include wildlife. The material that follows is based partly on Telfer and Dauphine (1981).

In this brief, the term "wildlife" refers to any non-domesticated vertebrate animal and includes fish. "Wildlife habitat" is the place where an animal lives: that is, the particular combination of vegetation types, soil, water, climate and other factors necessary for the survival and reproduction of wildlife species on a given area. "Wildlife management" means any policy, legislation or program of government to protect, control, enhance, perpetuate, use or allocate wildlife (Bossenmaier, 1979).

2. HISTORY AND DEVELOPMENT OF WILDLIFE CONSERVATION

Wildlife use and the development of wildlife conservation in Nova Scotia followed the historical trends elsewhere in North America; from colonial dependency on wild game and fish to 20th century recreational sport hunting and fishing; from earliest management through regulation of seasons and species to habitat alteration for improving the numbers and vigor of wildlife.

Early explorers found an abundance of wild meat and fish in the New World, and such table fare undoubtedly meant the difference between success and failure for many an early Acadian, as well as later settlers during their first few years on these shores. But as the forests were burned and cleared, the land subdued and turned into farms, many wildlife populations began to decline.

Concern for the fate of wildlife first began to mount in the late 1700's. It triggered the passage in 1794 of the first game law, which made it unlawful to kill partridge and blue-winged ducks at certain times of the year. This legislation was the first of many such regulations providing for the conservation and protection of wildlife in Nova Scotia. Indeed, regulatory management, managing game populations by controlling seasons and bag limits continues to this day. When used judiciously it is an effective tool of wildlife conservation.

In 1894, following many legislative Acts pertaining to game animals, an Act for the Preservation of Useful Birds and Animals was passed which provided for the appointment of Game Wardens. In 1896 the regulations dealing with hunting game animals were collected in the Nova Scotia Game Act. In 1900, the Revised Statutes provided for a Chief Game Commissioner to be appointed by Governor-in-Council. A new Game Act was passed in 1908, and in 1921 the name was changed to the Forest and Game Act. The latter was divided into five parts, with separate sections for forests, game and fish. Responsibility for administering the Act rested with the Commissioner of Forests and Game.

In 1926, the Department of Forests and Game was merged with the Department of Crown Lands and became the Department of Lands and Forests. The Act was divided into three parts: Part 1 -Crown Lands; Part 2 -Forests; and Part 3 - Game.

At one time refuges and sanctuaries also were thought to be vital to the welfare of dwindling wildlife populations. The first sanctuaries in Nova Scotia--Liscomb, Tobeatic and Waverley--were established in 1926. These areas excluded large blocks of land from hunting and trapping. Such protection, although it can play an important part in wildlife management under certain conditions, is of no avail if the forest habitats within these sanctuaries are subject to other, more disturbing, resource uses. A better approach is to manage these blocks as integrated resource management units which would include proper habitat management as well as control of game harvests. This approach was initiated for the Tobeatic area but has not been fully implemented.

Another important phase in wildlife management was the shifting of wild animals from one part of the world to another. Foreign game animal introductions, and re-introductions for formerly resident species, have added immeasurably to the value of our wildlife resources. Two exotic game birds, ring-necked pheasants and grey partridge, were introduced into Nova Scotia in the 1930's. Stocking of white-tailed deer occurred in the late 1800's and early 1900's. Re-introductions and transplants of beaver were begun in 1933. Four fish species have been introduced into the province, and include brown trout (1925), rainbow trout (1899), smallmouth black bass (1942) and chain pickerel (1924). Introductions of exotic animals are now known to pose several hazards. Introduced species may displace native animals, become pests and carry with them foreign diseases and parasites.

The most recent and important stage in wildlife conservation is land management--or more precisely, habitat management. It is now clear that habitat has the greatest influence on the kinds and numbers of wildlife species. Current wildlife management practices therefore focus on preserving and improving habitat for a wide variety of animals. In keeping with this view, the Department of Lands and Forests has established, through Orders-in-Council, Wildlife Management Areas. These are protected and/or managed according to the needs of the wildlife species for which the sites have been set aside. However, with only 0.10% of the land in Nova Scotia devoted mainly but not exclusively to wildlife, it is recognized that the challenge for the future is the preservation and enhancement of wildlife habitat on both private and Crown lands for which there are competing uses.

3. PUBLIC ATTITUDES TOWARD WILDLIFE

In the past decade or two detailed information has become available for judging the general interest in, and attitudes of people toward wildlife and wildlife management, as well as how they view wildlife in relation to other resource uses. A three-year study of American attitudes toward wildlife, other non-domesticated and domesticated animals, as well as wildlife habitat, reported that 76% of the American public thought cutting trees for lumber and paper should be done in ways to help wildlife even if this resulted in higher market prices (Kellert, 1980). Kellert also reported that 55% of Americans favoured protecting rare wildlife (birds and mammals) at the expense of job opportunities.

According to Evans (1972) wildlife attracts far greater public interest in the province than any other renewable resource. She reported that nearly 96% of Nova Scotians at some time or other within a 12 month period hunt, fish, trap, watch birds, feed birds, photograph wildlife, read books and magazines devoted to wildlife themes and/or view wildlife films and television programs.

Acadia University is now completing a questionnaire survey of Nova Scotians' attitudes toward wildlife and wildlife habitat, and toward funding schemes for wildlife management (Dodds, pers. comm.). Preliminary analysis indicates a very strong public interest in wildlife conservation and management. For example, 96.6% of the respondents felt that the forest industry has a responsibility to help conserve wildlife during forest harvesting and management operations. Also, 92.8% supported the protection of lands for wildlife.

Nova Scotians in this survey felt that at least as much money should be spent on forest improvement for wildlife as on forest improvement for wood production. Although the results from these two studies are not directly comparable, it is nonetheless clear that many people, both here and in the United States, believe wildlife to be an important feature of our landscape and heritage.

Broad public support for the sports fishery in Nova Scotia is evidenced by the fact that 200,000 anglers were active in 1980. Of these 80,429 were licensed (age groups 18-64 years). In 1980, licensed anglers fished for 1,292,600 person-days in fresh water and 210,600 person-days in salt water (Sabean et al).

An important point here is that the preferred fish are trout and salmon, species which both spawn in cool, forest shaded sections of freshwater streams. Forestry operations may have a profound effect on freshwater fishes, particularly these salmonids. Harmful changes to fish habitat may include higher water temperatures, increased silt, migration barriers and channel modifications.

Recreational hunting is another wildlife sport enthusiastically pursued by residents and many non-residents. More than 116,000 hunting licenses were issued in 1981, including almost 1,000 to non-residents .

Another measure of wildlife interest is the number of visitors to the Provincial Wildlife Parks, up from 215,000 in 1972 to 385,000 in 1980.

Further evidence of strong public support for wildlife is shown by the presence in Nova Scotia of more than a dozen wildlife, natural history and environmental organizations.

4. VALUE OF WILDLIFE

Answers to the question "What is wildlife really worth?" have proven elusive, even though much effort has been expended over the past several decades in seeking them. As pointed out by Bossenmaier (1979), many different types of evaluations, including economic, ecological and socio-cultural, have been undertaken to provide some rational basis for supporting wildlife management programs. The trend now emerging is that wildlife programs are becoming identified with particular, and often local, values such as hunting and fishing, wildlife viewing, trapping, education, science and environmental quality (Bossenmaier, 1979).

In socio-economic terms, the user values that Nova Scotians attach to wildlife may be categorized as recreational, commercial, biological, aesthetic, scientific and social. These values may be classified as tangible and intangible.

The tangible values of wildlife--those that lend themselves to various economic measurements--are recreational and commercial. Wildlife-related recreational activities are of high economic worth to Nova Scotians. The estimated total expenditure related to the recreational use of wildlife in Nova Scotia amounted to $37 million in 1973 (Elliot, 1975). If adjusted for inflation, these expenditures, in 1981 dollars, would be worth $74 million. Initial results of a new federal-provincial study of wildlife values indicates that 74 million dollars is an underestimate. A recent and more accurate estimate of total expenditures for sport fishing alone in 1981 is $22 million . Between 30% and 40% of provincial households feed birds in winter, for which the total dollar value of purchased feed in 1973 was $730,000 (Elliot, 1975).

The amount of game and fish obtained by successful sportsmen is also significant in terms of meat value and recreational benefits. In 1973, the estimated value of usable meat and fish taken by recreational hunters and fishermen in Nova Scotia was $4,900,000 (Elliot, 1975). On a cautionary note, measuring the monetary value of recreational wildlife pursuits is a formidable task, and all survey techniques have some limitations (Landlord and Cocheba, 1978).

Direct income to the Province from the sale of hunting, fishing and trapping licenses has shown a general increase over the past ten years, with total revenues reaching $1.5 million in 1980-81.

Wildlife has direct commercial value too. For many Nova Scotians the trapping of furbearing animals is an important additional source of income. In 1975 the returns to trappers from the sale of wild furs were $0.5 million, while in 1980-81 they were nearly $1.5 million. Equally important--if not more so--are the commercial sales of at least 3 species of freshwater dependent fish: salmon, gaspereau and eel. All are caught under licenses issued by the Department of Fisheries and Oceans.

The intangible values of wildlife have continued to elude any attempt to tally their economic worth. They include:

- Biological Values - those activities which benefit mankind, such as the reduction of losses from harmful insects, rodents and other injurious species, the scavenging and recycling of dead and decaying matter and the serving as a barometer by which the health of environments may be evaluated.

- Social Values - the benefits which accrue to the community, such as the opportunity for wholesome and communal outdoor recreation, hobbies and adventure, improved physical and mental health, beneficial use of otherwise idle land, alleviation of monotony, and the perpetuation of a sense of community through customs and traditions.

- Scientific Values - the benefits people either directly or indirectly receive through the use of wildlife and studies of wildlife relationships within natural systems, such as ecological relations, diseases and their spread, genetic studies, population behaviours, certain aspects of nutrition and reproduction, social organization, and effects of stress.

- Aesthetic Values - experiences of a personal nature that are of vital importance to the quality of human life. Such experiences as an early morning glimpse of a bald eagle or the sight of a large moose by a lakeside are priceless, and cannot as yet be valued in nay but aesthetic terms.

5. JURISDICTION

In presenting the case for forest wildlife, little can be accomplished without considering its legal status. Although jurisdiction over wildlife is not specifically set out in the British North America Act of 1867, the provinces do claim proprietary rights based on interpretations of several sections of that Act (Bossenmaier, 1979).

Nonetheless, over the years the Federal Government has taken the lead in wildlife management. Under the authority of 3 statutes it is involved in many wildlife programs and related activities: the Migratory Bird Convention Act of 1917, the Canada Wildlife Act of 1973 and the Fisheries Act of 1868. It is responsible for declaring animals in danger of extinction and for managing wildlife in National Parks and in National Wildlife Areas. It also negotiates wildlife matters, including the setting of seasons and bag limits on fish and migratory game birds with and between the provinces, and between nations. Less direct federal involvement results from national programs dealing with Native peoples, agriculture, forestry, regional and rural development, land, water and the environment (Bossenmaier, 1979).

The Province has a key role in wildlife managment because it has proprietary rights to wildlife and large blocks of land. Yet provincial wildlife programs, while reflecting the legislative-administrative views of the moment, must consider relevant legislation, policies and programs of previous governments. These may include rights of landowners and Native peoples, movement of wildlife across provincial borders, and private wildlife management activities (e.g. Ducks Unlimited, N.S. Bird Society, Nature Conservancy). As noted by Bossenmaier (1979), jurisdiction over wildlife in Canada is complex, involving two, perhaps three, levels of government and often several agencies. Clarification is long overdue.

In Nova Scotia, the Lands and Forests Act, R.S.N.S.. 1967, Chapter 163, Section 3, states that "the Minister of Lands and Forests shall have under his supervision, direction and control: (c) the protection, preservation and propagation of game and game fish". In keeping with this mandate, a primary objective of the Department is to protect, preserve and generally improve the conditions for the fish and wildlife of the province. Such protection and preservation of wildlife is effected through the Lands and Forests Act, Part III - Game.

The Wildlife Division, a unit within the Program Planning Branch of the Department, is presently structured with a Director and five Managers responsible for big game, small game and fur-bearers, migratory birds, inland fisheries and non-game. Their work includes wildlife habitat and population inventories. These are designed to provide information upon which to base recommendations regarding hunting, fishing and trapping regulations, habitat manipulations, land use, etc. In addition, 6 of 8 provincial Department sub-divisions within the Operations Branch have regional biologists who can implement programs, provide liaison with the public, and effect vital day-to-day interaction with the Department personnel involved in forestry operations.

6. FOREST-WILDLIFE MANAGEMENT CONCERNS

Integrated Forest Management

Telfer and Dauphine (1981) note that the concept of multiple resource use is often preached but seldom practiced. Affirmative policies requiring that wildlife as well as other resources be considered in forest management planning should be stressed whenever possible. Presently, the goal of multiple use of forest resources is often not reached because the emphasis is on pulp and timber production. Other uses, like wildlife, may receive notice when they are of special significance or when they are unlikely to hinder forest management.

Fortunately, in Nova Scotia the responsibility for managing public forest land and wildlife resides within one agency. Integration of wildlife habitat management with forest management on Crown lands is planned jointly by the Forest Resource Planning Unit and the Wildlife Division. Such plans are implemented on a cooperative basis between regional biologists and foresters in the Operations Branch. This makes the goal of integrating wildlife management with forest management much less difficult to attain.

Inherent in forest management is road construction. Remote forested areas, when penetrated by roads, soon lose their wilderness character. Greater accessibility also carries the threat of overharvesting game and fish, particularly native trout. Locating woodland roads to reduce such negative impacts should always be an important goal. Also, woodland roads should be gated and/or allowed to revert to forest land after the wood products have been removed.

Wildlife on Private Lands

Approximately 75% of land in Nova Scotia is in private ownership. The factor exerting the greatest impact on wildlife is therefore the quality and kind of forest management practised on private forest lands. More than anyone else, it is the private woodlot owner who influences the numbers and kinds of wildlife species. Yet the game and non-game animals produced in his forest are considered Crown property. The Crown sells the right to pursue the game, which then becomes the property of the hunter or fisherman when he catches or kills it. The forest landowner, however, receives nothing in return for this product of his land.

It is not surprising then, that landowners give little thought to managing their woodlots for wildlife and forest products together. Indeed, many landowners, confronted with vandalism caused by thoughtless hunters, drivers of all-terrain vehicles and others indifferent to landowners' rights, post "no trespassing" signs and refuse to allow sportsmen and other outdoor recreationists on their land. Such conflicts have increased hunting and other outdoor recreational pressures on Crown lands. This lends a degree of urgency to developing integrated approaches to managing public forest lands.

The increasing trend toward closure of private lands to sportsmen might be slowed by providing some financial motivation to woodlot owners for keeping their lands open. Moreover, such a scheme might be linked with incentives to improve private forest land for wildlife. This might be accomplished by including in government-subsidized forest management programs on private lands, the condition that the grant would be approved only if wildlife interests were considered in the plan and the area left open to sportsmen.

Other such incentives might include tax relief, landowner fees for hunting, and permission to sell wild game. An inescapable conclusion is that unless some element of financial gain enters the wildlife sphere, there is little hope of encouraging landowners to manage for wildlife, or of reversing the trend toward denying public access.

Wildlife Production Goals.

To implement policies requiring integrated management obliges wildlife biologists to quantify their forest-wildlife goals. At present such goals are obviously less defineable in economic terms than those required of foresters. Nonetheless, some quantitative measures (perhaps ones suggested by Telfer and Dauphine (1981)), that set out the minimum acceptable kinds of numbers of species based on the capability of the land to support wildlife, would be required in order to assess the effectiveness of forest management practices in producing wildlife. So it will become increasingly important that wildlife biologists and foresters cooperate.

Forest Wildlife Inventories

Detailed inventories of resources on both private and Crown forest lands are in varying stages of development as a cooperative venture between forestry and other resource interests. Wildlife inventories and habitat assessments may be conducted by regional biologists during the preparation of plans for managed woodlands. Also a province-wide wildlife habitat inventory is underway as a joint project between the Forest Resources Planning and Mensuration Divison and the Wildlife Division.

Research

There is little information presently available on the specific habitat needs of many forest wildlife species. There is also a lack of understanding of how forest ecosystems function. Forest managers require more basic data on forest and stream ecology. There is a need for long-term monitoring studies of forest habitats and wildlife populations, and a need for in-depth studies of short duration on individual species and their relationships to the forest (Telfer and Dauphine, 1981). Such studies, they suggest, should follow acceptable forestry techniques and terminology wherever possible.

Besides the lack of basic ecological data, little is known of the effects of various forestry practices on wildlife in this region. But we can be certain that timber and pulp harvesting methods, regeneration techniques including site preparation, stand-tending procedures like thinning, and measures for forest protection such as fire suppression and forest spraying all influence wildlife.

Dalhousie University completed one short-term, limited study of the impact of forest harvesting on birds in 1979. Personnel from Acadia university are now measuring the effects of certain silvicultural and forest cutting practices on entire forest communities. Some work has also been done on the effects of clearcutting on stream temperatures (Sabean, 1976; 1977).

More such applied research projects need to be undertaken and added to existing literature. In future, computer simulation and modelling of wildlife habitat conditions will become necessary if reasonable predictions are to be expected (Telfer and Dauphine, 1981).

While some information on protecting and enhancing wildlife habitat in northeastern forests is available, much of it is scattered, or not in a form readily useable by forest managers. This information should be condensed as guidelines and packaged in manuals. Only one such provincial publication is now available to woodlot owners. Among the many practical measures are:

- developing and maintaining broad strips of vegetation along the banks of trout and salmon-producing streams and rivers (to protect these important waters and to provide streamside habitat for other wildlife);
- planting barren areas along woods roads and trails (to reduce erosion);

- protecting forests wetlands from dumping, filling, draining and similar abuses (because of their ecological and biological importance);
- leaving mature softwood stands of at least 4 ha (10 acres) with 70% crown closue (as a winter deer yard nucleus).

Such techniques will have a positive effect on wildlife populations. All foresters and forest landowners need such information in the form of a practical wildlife management manual.

It is imperative too that the general public information programs on wildlife conservation and management in Nova Scotia be continued. Such materials are made available through the Forest Resources Education Subdivision, whose staff includes a biologist. The appeal of wildlife and wildlife-related matters to Nova Scotians can be measured by the increased demand for such information. For example, subscriptions for **N.S. Conservation,** a free quarterly publication containing articles about wildlife and other natural resources, rose from 9,864 to 15,090 in one year (Lands and Forests Annual Report). It will be unfortunate indeed if financial restraint programs force the cancellation of this magazine.

7. SUMMARY

The increasing demands on forests to produce more than wood fibre places growing pressure on all forest lands. To satisfy these demands will require further changes in policy to integrate wildlife and other forest resources into forest management planning. The main factors that work against this are in the social, political, economic, legal and administrative realms, rather than those of technology.

It is clear, however, that public attitudes and opinions alone will not alter the perception that forests have no utility beyond the traditional single-purpose economic one. New approaches are needed.

Integrated forest management, if the public wants it, is attainable. Today's managers largely ignore it because few people demand it. However, forest management decisions made now will determine the future numbers and kinds of forest wildlife. It is hoped that future generations of Nova Scotians will also learn to tend the forests with judgement and care--because there is more in a forest than trees.

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Part 3

Recreation & the Forest Environment

1. PROVINCIAL PARKS AND OUTDOOR RECREATIONAL OPPORTUNITIES IN THE FOREST ENVIRONMENT

Introduction

Provincial Parks and public outdoor recreation represent a priority land use in the forest environment and, indeed, in Nova Scotia. Historically, Nova Scotians have been an outdoor people, both at work and at play and are typically proud of their province's quality of life, its scenery and natural resources. These same attributes have attracted tourists in increasing numbers. Accordingly, the outdoors has become the focus of a major promotional thrust in the Province's tourism marketing program.

For this reason, Provincial Parks and public outdoor recreational opportunities on Crown lands have a special significance. They provide the land base on which the outdoor recreational needs and expectations of both residents and tourists can be met, now and into the future. Therefore, if social, economic and environmental values are to be sustained, a comprehensive forest management policy must maintain and improve these resources. Provincial Parks represent a social amenity for residents, an important resource for tourism, and safeguard against loss of heritage resources. Because they are a single-purpose land use, they are relatively secure from incompatible land use impacts.

Outdoor recreational activities also occur on Crown land beyond the boundaries of parks and related reserves. These activities may be intensive, with concentrated numbers of users (e.g. beaches, camping areas); or extensive with dispersed user activities requiring minimal facilities and services (e.g. hiking, viewing, nature study). Participation in outdoor recreational activities in the province's forest lands and undeveloped backcountry provides users with healthful and wholesome outdoor experiences. It also affords enjoyment, understanding and appreciation of the province's outdoor heritage.

In its dual concern for heritage protection and outdoor recreation, the Parks and Outdoor Recreational System presents a complex management challenge. Within Provincial Parks care must be taken to ensure that user impacts are not permitted to compromise the integrity of the resources that the System is intended to protect and maintain. Outside the System this is even more difficult to attain, because there is competition for the land. To achieve harmony, competing land uses must be reconciled--an ideal which is very difficult to achieve.

Resolving land use questions equitably requires consideration of costs and benefits to the people of Nova Scotia. Often establishing the cost-benefit ratio becomes very difficult. For example, allocating land between parks and commercial forestry brings differing values into play. Although each has measurable economic benefits, ultimately the intangibles associated with heritage resources and quality of life must somehow be given equal weight with economic multipliers such as jobs generated, foreign exchange earned, and value added to the provincial economy.

Provincial Parks

In Nova Scotia, Provincial Parks are designated through Order-In-Council under the Provincial Parks Act passed in 1959. As stated in Section 6 of this legislation, Provincial Parks are to be used for:

- the pleasure, recreation and benefit of the public,
- the conservation, maintenance and protection of animal, bird and fish life therein; and

- the preservation of areas and objects therein of geologic, ethnologic, historic and other scientific interest.

These objectives are consistent with those of provincial parks systems across the country.

In general, the benefits attributed to Provincial Parks can be listed as recreational, psychological, cultural, economic and environmental. They also contribute to social development, outdoor education and the maintenance of scientific benchmarks and gene pools. Although many of these benefits are intangible and difficult to quantify, they are clearly important to our quality of life.

One indicator of the magnitude of the economic benefits is the relationship between Provincial Parks and the province's important tourism industry. It has been shown that tourists are attracted here by our attractive scenery, historic resources and outdoor recreational opportunities. Since provincial parks provide many of these, obviously this industry very much depends on a good Provincial Parks System.

Basic Values and Benefits of Provincial Parks

- Recreational Activities: Outdoor recreation contributes to individual growth and development. Provincial Parks provide opportunities for individual physical activities (bicycling, swimming, hiking, etc.), group activities and sports (playgrounds, field and court games), and for development of outdoor skills (camping, sailing, fishing, canoeing). These activities assist in physical fitness and physical development, and contribute to the health of Nova Scotia citizens.

- Phychological: Provincial Parks provide a wide range of programmes and facilities for creative, relaxing and rehabilitative leisure time pursuits. They provide opportunities to escape the routine aspects of everyday life, to pursue individual choices and freedoms, and they contribute to personal health and enjoyment of living.

- Social Development: Provincial Parks contain programmes and facilities for all socio-economic elements of our population. They provide opportunities for social interchange, group activities, and assist in the individual's understanding of himself, and of the province and its people.
- Outdoor Education: Provincial Parks provide learning opportunities for formal education in an outdoor setting for students of all ages. They may complement classroom education with supplementary learning experiences in general science, personal exploration and research.
- Outdoor Laboratories: Provincial Parks provide controlled areas where research on the natural environment may be conducted. The wider the range of habitat types represented, the greater the scope for research. This is directed either toward achieving park objectives or toward topics of interest in provincial resource management.
- Scientific Benchmarks: Provincial Parks can safeguard environmental benchmarks which may be used to monitor environmental change.
- Gene Pools: Provincial Parks may be of critical importance for rare or endangered species of plants or animals. Parks may protect a segment of a species' gene pool through protection of the population within the park. Also, plants of medicinal, agricultural or other purposes may eventually be developed from wild stocks maintained in parks or similar reserves. In both of the above

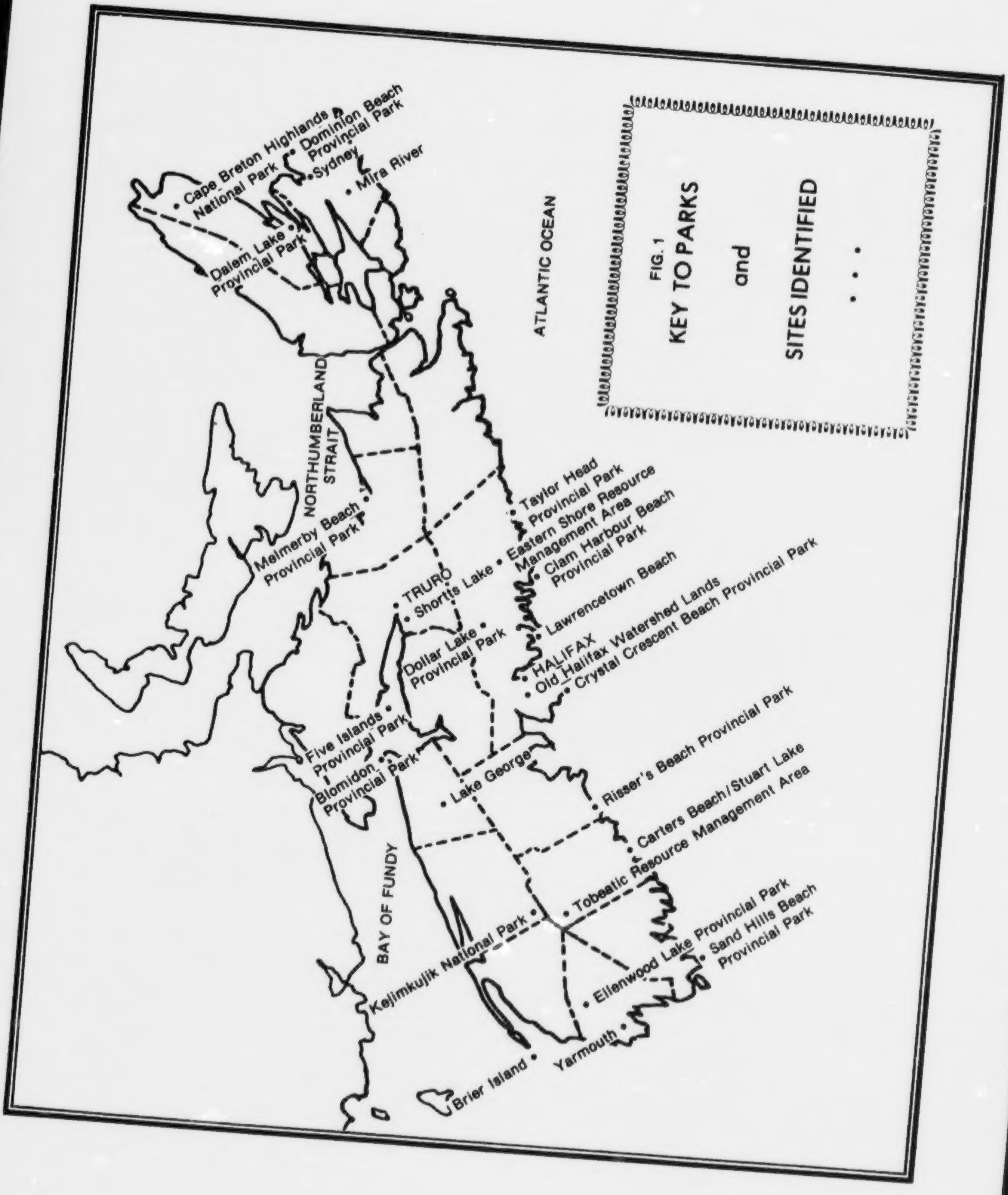
ways, parks serve to maintain sources of genetic diversity.

- Environment: In areas under heavy pressure for industrial, agricultural, or urban purposes, Provincial Parks may contribute to regional open space, performing an aesthetic and a utility role within a mixed pattern of land uses. They also contribute significantly to the conservation of land, water, vegetative and wildlife resources.

- Economic: Provincial Parks provide travel and vacation incentives to Nova Scotians and out-of-province visitors. This aids in redistribution of monies, acts as an exchange for monies from outside the province, and stimulates demand for goods supplied by liesure oriented industries.

Nova Scotia's Provincial Park System originated in response to demands for roadside picnic sites and campgrounds. Provincial Parks of the late 1950's and 1960's were essentially for the travelling public. By the mid-seventies, the demand for beach facilities led to the establishment of several major beach parks, including Melmerby in Pictou County, Sand Hills in Shelburne County, and Clam Harbour in Halifax County (Figure 1). Only recently has the program been broadened to include larger, resource-based parks which provide quality outdoor recreational experiences in the natural environment. Outstanding examples of these are Blomidon in Kings County, Five Islands in Colchester County and Taylor Head in Halifax County. In these parks the forest environment is a major element.

Today's Provincial Park System reflects its origins and evolution. In all there are 97 operating parks. They are of three types: picnic parks, beach parks and campground parks. Of these, 78 provide day-use opportunities and 19 are campgrounds, generally with a day-use component. Although efforts have been made recently to emphasize resource-based parks, the overall character of the System remains



Cape Breton Highlands National Park
Dominion Beach Provincial Park
Sydney
Mira River
Dalem Lake Provincial Park
ATLANTIC OCEAN
NORTHUMBERLAND STRAIT
Melmerby Beach Provincial Park
Taylor Head Provincial Park
Eastern Shore Resource Management Area
Clam Harbour Beach Provincial Park
TRURO
Shortts Lake
Lawrencetown Beach
Dollar Lake Provincial Park
HALIFAX
Old Halifax Watershed Lands
Crystal Crescent Beach Provincial Park
Five Islands Provincial Park
Blomidon Provincial Park
Lake George
Risser's Beach Provincial Park
Carters Beach/Stuart Lake
Tobeatic Resource Management Area
BAY OF FUNDY
Kejimkujik National Park
Ellenwood Lake Provincial Park
Sand Hills Beach Provincial Park
Yarmouth
Brier Island

FIG. 1

KEY TO PARKS

and

SITES IDENTIFIED

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essentially user-oriented. This utilizes a relatively narrow segment of the total range of opportunities.

The total area devoted to Provincial Parks within the province is approximately 6 500 ha (16,000 acres). Approximately 40% of these parks contain less than 10 ha (25 acres) and 65% less than 40 ha (100 acres). The Province's largest Provincial Park, Taylor Head, is approximately 800 ha (2,000 acres). In addition, there are some 9 600 ha (24,000 acres) in park reserve land within 119 units not developed as Provincial Parks.

Within Nova Scotia there are few other land use designations which directly complement the role of Provincial Parks. National Parks, of course, provide quality outdoor recreational opportunities and protect natural history resources. National Parks, however, are established to attain national objectives. Thus, they emphasize the protection of nationally significant resources. The Special Places Act (1979), administered by the Department of Education, is intended to protect provincially significant heritage and scientific resources. However, Provincial Parks will continue to manage provincially significant natural history resources of outdoor educational value, where public access is desirable.

Outdoor Recreation

As earlier noted, unstructured outdoor recreational activities occurred in the forest environment long before the establishment of Provincial Parks, and continues today. These traditional activities include hunting and fishing. Recently, such activities as hiking, canoeing, backcountry camping, snowmobiling, trail biking, cross-country skiing, nature study and photography have risen dramatically. This has exerted new pressures on the resource base, causing deterioration of the natural environment and in the outdoor experience.

The outdoor recreational activities which occur beyond Provincial Park boundaries have not traditionally benefited from a comprehensive management program. Although this falls within the broad mandate of the Lands and Forests Act, this legislation emphasizes management of the commercial forest and of wildlife resources. In terms of outdoor recreation it makes specific provision for managing fish and game, but a corresponding program of providing facilities and services for fishermen and hunters has never been established. Also, the Act makes no specific provision for managing certain Crown land recreational activities whose popularity has been increasing in recent years.

A Time for Re-Evaluation

A recent study of the Nova Scotia Parks and Outdoor Recreation System (Lands and Forests, Boggs, 1976) contains a comprehensive review of the Provincial Parks and Outdoor Recreation System. Its recommendations form the basis for programs now being developed. Perhaps the most notable implementation has been the establishment, in 1980, of the Provincial Parks, Heritage Resources and Outdoor Recreation Program by the Deputy Ministers' Committee on Land Use Policy.

This program, recognizing the varied departmental responsibilities for elements of the Parks and Outdoor Recreation System, establishes a common goal and objectives, and a common planning and management framework. It also provides a standing support committee representing the Departments of Lands and Forests; of Education (Nova Scotia Museum): of Culture, Recreation and Fitness; and of Tourism. The common objectives embrace the broad categories of Preservation, Interpretation and Outdoor Education, Outdoor Recreation, Travel and Tourism, and Co-ordination.

Goal Statement:

To provide opportunities for outdoor recreation, heritage appreciation and scientific research through the management of provincially significant natural, historical and recreational resources and environments within a system of Provincial Parks, related reserves and provincially designated public outdoor recreational opportunities.

Objectives:

- Preservation: To preserve provincially unique, representative or otherwise significant physical, geological, biological, archaeological and historical resources or other cultural areas, features, artifacts or objects in their natural settings.
- Interpretation and Outdoor Education: To relate to residents of the province and to visitors, the significant stories and themes respecting the natural and historical heritage of the province, through on-site efforts, where desirable, and through media techiques, where more appropriate.
- Outdoor Recreation: To provide a wide variety of quality opportunities for resource based outdoor recreation, which are equitably distributed on the basis of accessibility to residents of the Province, and which respond to the particular needs of the province's urban residents.
- Travel and Tourism: To enhance travel and tourism-related activities within the province through the protection and interpretation of significant natural and cultural resources and

through the provision of outdoor recreational opportunities and related amenities in a manner that is both complementary to and compatible with the efforts of the private sector.

- Coordination and Integration (Programme Objective): To achieve inter-departmental and inter-agency coordination with respect to the management of parks, heritage resources and outdoor recreational opportunities within the province, and to foster compatibility of action with respect to potentially conflicting government programmes, private enterprise and private property owners.

A major portion of the report dealt with establishing a classification system to guide the management of parks and recreation resources. In essence, the proposal represents a land management framework that would attain our overall objectives within different classes of Provincial Parks, on Crown land, and to some extent on private lands. Although the classification system has not been formally adopted, a number of existing parks and park proposals reflect the intent of the classification approach, particularly with regard to resource-based, natural environment parks.

In addition, a number of elements of the classification system which fall outside the scope of the Provincial Parks System have also been addressed. Two areas, the Eastern Shore and the Tobeatic, have been studied as potential multiple use resource management areas where outdoor recreation may be treated as the primary land use. Also, new legislation has been established for two other classes, namely, heritage reserves (Special Places Act, 1979) and trails (Trails Act, 1978). A particularly significant aspect of these Acts is that they provide for implementation of these programs, in part, through agreements with private land owners.

Despite this progress, much work needs to be done if the full range of objectives associated with the System are to be achieved. The following sections deal with some challenges.

2. OUTDOOR RECREATIONAL OPPORTUNITIES: ARE THERE ENOUGH?

The Recreation and Natural History Resource Base

The Canada Land Inventory, which classified land capability for recreation, has documented the quality, quantity and distribution of recreational land in the province. The following is summarized from this inventory.

Nova Scotia possesses a unique landscape created by diverse geologic and geomorphic influences providing a wide range of scenic landscapes, recreational attributes and natural history features. The greatest concentration of high quality recreational land occurs along the warm waters of the Northumberland Shore and along the Bras d'Or Lakes. Almost two thirds of the finest bathing beaches in the province occur along the Northumberland Shore. The Bras d'Or Lakes provide for a complete range of outdoor recreational activities in a highly scenic and culturally rich setting.

The greatest concentration of natural history features occurs along the Fundy shoreline. Some of these are internationally renowned. Due to severe coastal exposure, the Atlantic Coast has a lower recreational capability in conventional terms. But is contains over 50 major sand beaches and many fine Atlantic Ocean vistas.

The province's inland resources include lakes, rivers, forests and hilly topography. Inland lakes and associated forest lands provide opportunity for a wide variety of activities. These have generally been the most intensively utilized year-round recreational resources in the province. Lakes with high recreational capability are few in number but high in value. They generally occur where good soil conditions exist in the Atlantic Upland. Several chains of lakes provide very high quality back country travel and have a long tradition of such use. The rivers of the province are widely known for their sport fishing and their scenic rapids and waterfalls. But due to low summer flows, only a few are suitable for canoeing and boating.

The reliefs resource of the Province are found primarily in the Cape Breton Highlands, the Cobequid to Antigonish Highlands, and the North Mountain. These offer many spectacular views, steeply incised valleys, waterfalls and remnant forest types of both aesthetic and scientific value. Because the highlands sustain a heavy snowfall, they are the most significant winter recreational areas.

Land Ownership

With a relatively limited resource base of high quality recreational land, it is crucial for the province to concentrate on those resources which will optimize outdoor recreational opportunities, guarantee quality environments, and provide the resource base necessary to sustain the tourism industry. Land ownership is a key factor here. The highest level of management and control is possible only on resource lands owned by the Province.

Compared to other provinces, Nova Scotia has the second lowest percentage of land in public or Crown ownership. Equally significant is the quality and distibution of land by ownership class. Traditionally land settlement and private ownership occurred in coastal areas, the more fertile river valleys and uplands, and in association with the more productive forest lands. There is a strong correlation between this and the highest capability land for recreation, as documented by the Canada Land Inventory.

The land which has remained in Crown ownership is generally located away from settled areas. Through land acquisition programs over the past several decades, the Crown has managed to secure some relatively small holdings of high capability recreational lands. Data available on the Province's two most important recreational and natural history resources, its salt water frontage and inland lakes, illustrate this ownership pattern.

Nova Scotia salt water frontage totals 10 518 km (6,535 miles) of which 90% is privately held. Approximately 943 km (594 miles) or 9% of the shoreline is high recreational capability land, (i.e. CLI Classes 1, 2 and 3) and of this only 10% is in public ownership. The best beaches in the province make up 248 km (154 miles) or a mere 2% of the total provincial shoreline. Of this only 50 km (30 miles) is in public ownership. The Crown owns only 5% of the high capability land along the warm water shoreline of the Northumberland Strait. Similarly, the Fundy Shore with its exceptional scenery and natural history resource base has only 5% in public ownership. Even more striking is the highly significant Bras d'Or Lake shoreline where the Crown owns only 2.9% of the 1 130 km (700 miles) of shoreline.

There are 900 fresh water lakes in the province. Their shorelines are rated by the Canada Land Inventory as Classes 1 to 5 for recreational capability in Nova Scotia. Of these the Province owns 14%, while 52% are privately owned. The remaining 34% of the lakes are owned partially by the Crown and partially by private landowners. Of the 900 lakes, there are relatively few with high capability for sustaining intense recreational use. The Crown has complete shoreline ownership of just 2% of these high capability lakes and partial ownership of 41%.

A portion of the Crown-owned lakes of low capability for intense recreation are interconnected, which allows for extended travel opportunities and a unique chance for wildland heritage appreciation. As these chains of lakes are in areas of low soil productivity which severely restricts other land uses, most of their natural qualities have been maintained. This creates a fortunate management opportunity for the Province. Two areas which illustrate this opportunity are found in the backcountry of the Eastern Shore between Lake Charlotte and Ship Harbour, and in the Tobeatic country in western Nova Scotia.

An important point to note is that under the Provincial Parks Act only 9.5 miles of Provincial salt water shore frontage has been dedicated for recreation, conservation and preservation. This represents only 0.15% of the province's total shore frontage. Also, of all the lakes in Nova Scotia, only 2 (Dollar Lake, Dalem Lake) are managed for recreation by the Province. This is through dedication under the Provincial Parks Act. However, there are several proposals currently under review which could increase the Province's lake recreational resources.

It is worth noting that Crown land recreational resources are not evenly distributed thorughout the province and are not generally associated with population centres. For instance, Cape Breton County with its population of 130,000 is significantly undersupplied with Crown land recreational resources. Of the 78,000 acres of Class 4 or higher land, only 1,600 acres or 2% is Crown land. Of these 1,600 acres, 1,300 acres are in existing Provincial Parks, which are already under very heavy pressure. The remaining 98% is in small private ownership and largely occupied by cottage lot development.

The same situation holds true for other population centres - Truro, New Glasgow and the Annapolis Valley. The only exception is the Halifax metro area where the recent acquisition of Lawrencetown Beach and the Old Halifax Watershed lands will help to alleviate some of the problems.

Competing Uses

The provincial recreational resource base, if properly managed, can provide the province with many social and economic benefits which will enhance the quality of life. However, it has been demonstrated that the ownership and distribution of quality resource lands are such that they represent constraints to good management. The ability of the Province to effect good management or stewardship principles is also restricted by the competition for the resource base. This results in both an absolute loss of the physical base, and a qualitative loss of that which made the resource socially and economically valuable in the first place.

Losses of high quality recreational land to private land use activities is clearly evident throughout the province. A flight over the province illustrates that much of the high quality shoreline has been divided into small lots and developed for cottages and summer houses. Besides the direct physical loss of the recreational and heritage land base, there is a loss of scenic and environmental qualities created by crowded developments which often illustrate a lack of regard for aesthetics or environmental quality.

Examples of this are found on the North Shore between Tidnish and Merigomish, where they form almost a continuous strip of development, and at Mira River, where over 450 cottages are crammed in between Marion Bridge and Mira Gut. In some areas water quality loss due to pollution from cottages has been documented. Shortt's Lake, (Colchester County), Mira River (Cape Breton County) and Lake George (Kings County) are unfortunate examples. Such problems are most acute where cottage development blocks public access to traditional recreational areas. In some cases the Province has attempted to secure public access to a beach through cottage developments. But conflicts arise when the rights and privacy of property owners are threatened by the public. Many of the Province's recent day use beach development master plans have called for acquisition of private cottages in order to supply enough land for effective management control of the resources for the public (e.g. Melmerby Beach, Pictou County; Taylor Head, Halifax County; Sand Hills Beach, Shelburne County). Often, however, such acquisitions are impossible.

Also, in the interior of the province there is a growing number of developments, by both large and small landowners, of high quality freshwater lake shorelines. Over time these could seriously diminish the supply of available recreational lands and restrict traditional public access.

Throughout the province there are examples of significant recreational resources being lost or threatened due to private land developments. A recent example is at Carter's Beach, Queens County, where a private land developer has purchased and subdivided recreational land on nearby Stuarts Lake. This purchase, reputedly by a foreign buyer, occurred while the Department of Lands and Forests was actively attempting to purchase this land for a Provincial park large enough to assure appropriate management and protection of the beach.

One of the most significant sources of competition for the Nova Scotia recreational and natural history resource base is foreign ownership. A 1971 study by Dalhousie University's Institute of Public Affairs found that non-residents own about 400 000 ha (1 million acres), including 270 000 ha (660,000 acres) of prime recreational land and almost one third of the total recreational shoreline of the province. Thus, around the Bras d'Or Lake non-residents own 24% of the shoreline. Although not documented, it is perceived that foreign ownership prevents Nova Scotians from fully enjoying their natural heritage by restricting access to beaches and lakes, and by pushing up land prices. Both local residents and the Crown have found it difficult to compete in the purchase of properties for desired purposes. Land has been reputed to be purchased for speculative purposes and sold many times 'site unseen' for larger and larger sums of money.

There are examples throughout the province where provincially unique or significant land is owned by foreign interests--such as Brier Island, Stuarts Lake or the Bras d'or Lake. Foreign interest can be attributed to the fact that the beaches, coastline and untouched countryside are within easy access of major American and European centres where land values are higher, where land ownership and use can be more restrictive, and where quality natural attributes are limited. Provincial control of resource lands must not be diminished in this way. This trend to non-resident ownership can severely restrict Provincial alternatives in managing its own resource base.

The Supply of Dedicated Land

The amount of resource land dedicated for public recreational use in Nova Scotia is far below accepted norms in Canada. Tables in the Nova Scotia Parks & Recreation System Plan compare Nova Scotia's record to other provinces (Lands & Forests and Boggs, 1976). Three observations were highlighted for consideration:

- Nova Scotia's net park holdings on the basis of per captia open space are the lowest in the country.
- Nova Scotia's ratio of Federal to Provincial parkland is the highest in the country, which improves its per capita open space portion, but still leaves it in the third lowest rank in Canada.
- The range of resource attributes and recreational opportunities currently available on Provincial Parkland is inadequate relative to generally accepted norms in Canada.

There has been an underlying confusion about the significance and roles of Provincial and National Parks in Nova Scotia. National Parks, by preserving land important to the nation as a whole, reflect a commitment to land stewardship by the Federal Government that does not negate the stewardship responsibilities for land under Provincial control. There is little doubt that the public expects Provincial Crown lands to be managed and/or allocated for a variety of uses. To argue that the two national parks represent a sufficient land allocation does not recognize the reality that the Province has its own resource base to manage with its own scenery, its own fish and wildlife populations, its own recreational resources and its own public demands and expectations.

A measure developed in the U.S. for assessing state parkland acreage requirements in relation to population suggest a standard of 70 acres/1000 of population be utilized. This measure (Lands & Forests and Boggs 1976) revealed that Nova Scotia should have 23 350 ha (57,680 acres) of provincial parkland which would entail an additional 14 400 ha (35,562 acres) be added to the 8 700 ha (21,518 acres) of park and reserve lands. In jurisdictions such as Nova Scotia, where a healthy tourist industry is important to the provincial economy, the standard would require upward adjustment to reflect this additional demand source.

Whatever standards are set in other provinces and countries, it is worthwhile to point out that Nova Scotia has its own particular set of problems, opportunities and user preferences. Collectively these will determine the precise supply targets which should be set as determinants for the long term growth of the Park System. While it is true that some targets, especially those pertaining to the representation of natural features within the Park System, can be set without a complete understanding of the demand for recreational opportunities, it is necessary to gain a clearer understanding of demand as a basis for rationalizing decisions related to the amount of land and the type of opportunities/facilities which should be provided in future.

To date funding has not been available to direct toward a comprehensive study of supply and demand. However, there is clear evidence of undersupply which must be heeded in the short term, if opportunities that exist for land acquisition are not to be lost. There is little social, environmental or economic consolation in knowing how many people wish to participate in an activity or seek a specific amenity, when the potential to provide that opportunity has been permanently lost.

In Nova Scotia the allocation of recreational land has fallen behind the growing demand, resulting in a number of serious problems:

- Overcrowding on weekends and other holiday peaks, of parks located close to major urban centres (Crystal Crescent Beach, Halifax County; Dominion Beach, Cape Breton County; Melmerby Beach, Pictou County).
- Construction of high density cottage developments which restrict the ability of the general public to gain access to provincial beach resources.
- Indiscriminate and unmanaged recreational use of forest areas, resulting in littered lands and overuse of accessible resources e.g. depletion of fish stocks.
- Overcrowding during summer vacation periods of the few parks in the province that offer destination attractions in a quality natural environment (Risser's Beach, Lunenburg County; Ellenwood Lake, Yarmouth County).

It is important to note here the Provincial Park System to date has supplied the public with only a few parks of sufficient size, attractiveness and resource variety to provide for the destination demand in the province. This imbalance is being addressed. Meanwhile, there is limited opportunity for users who wish to appreciate the province's natural heritage and to utilize some of its prime recreational resources during extended stays.

3. FORESTS AS A HERITAGE RESOURCE

The Concept of Heritage

Nova Scotia's forests constitute an important heritage for its residents. Implicit in the concept of a heritage is the passing down from one generation to the next something of value, maintained intact. The natural history of an area may be viewed as a heritage of the inhabitants: something which must be understood and used wisely so that it will remain intact for future generations. Also, over time, the interaction between this natural environment and the people living in it produces a tradition of use and a cultural landscape. This too, may be considered a heritage and worthy of preservation.

The Human Imprint on the Resource

The original Acadian forest has provided the raw material which human activity has shaped and changed into the forest that exists today. For over two centuries, the forests have been intensively used for a variety of purposes. Shipbuilding required both tall trees for masting and other types of lumber for general construction. Buildings of all kinds have been constructed of wood, and the wood frame architecture of Nova Scotia is a distinctive characteristic of the region. The fishing, mining, and farming industries use wood for a variety of purposes. Wood is burned for fuel, and over the past century, the pulp and paper industry has been placing increasing demands upon the forest resource.

The forests with their lakes and streams have also been much more than a supplier of wood to Nova Scotia. They have served as habitat for game and fish, as travel routes through the interior of the Province, and as places to be enjoyed for their beauty. Much of their attraction derives from contrast with the coastal region: within a short distance, a remarkable change in climate, topography, vegetation and resources is realized. A pattern of use was set by the original Micmac residents, who travelled the forest rivers to the coast in the spring, and returned to hunt game in the fall and winter.

There is a traditional seasonality to the use of the forests, with canoeing and fishing in spring, berry picking in high summer, hunting in fall, and trapping in winter. In more recent years, changing technologies and recreational activities have broadened and intensified this use.

Forest recreation has long been recognized as both a part of a way of life, and as an important economic activity. By the late nineteenth century, Nova Scotia was being promoted on the North American travel market as an accessible wilderness, with a variety of outdoor recreational activities, but primarily for hunting and fishing. The well-known book The Tent Dwellers by A.B. Paine, (1908) brought Nova Scotia much publicity, as did the Province's display at the New York Sportsmen's Show in 1909. In the mid-1920's, a Provincial travel brochure emphasized the natural resources of the province: "great tracts of deep woods which hunters know for a multitude of lakes and streams, for moose and deer hunting and for canoeing trips and fishing" (Department of Highways, undated).

Both the pattern of use of the forest and our perception of it as an "accessible wilderness" are long established with Nova Scotians and visitors alike. The questions arise: how valid are these perceptions, and can the forests sustain these expectations? The Province's population continues to grow and spread. Visitor travel increases. Both groups approach the forest environment and increasingly sophisticated technology, ranging from all-terrain vehicles and snowmobiles to lightweight camping equipment. The forest is called upon to bear an increasingly heavy burden of recreational use. This comes at a time when other traditional uses--pulp, lumber, fuel--are also increasing. It is an open question how much the forest can sustain.

Present State of the Resource

After more than three and one half centuries of use, the forests of today likely bear little resemblance to the original Acadian forest. Landclearing, repeated burning, the traditional forestry practice of highgrading, and more recently clearcutting, have all left their mark. As well, a variety of insect pests and diseases such as the beech scale, larch sawfly and Dutch elm disease have seriously depleted several species of trees.

Many of these changes are not recent. Fernow (1912) in the first forest inventory conducted in the province, described the deteriorated state of the forests, and estimated that fully 20% of the province could be classed as barren. Many of these barrens were the products of fire or poor forest practices.

Nonetheless, some excellent examples of the original forest types remain. A number of these were identified in a study which was part of the International Biological Programme (1974) which identified sites of natural history significance and interest. Among the forested sites identified in this study were old-growth hemlock forests, stands of mature tolerant hardwoods and of red spruce, disjunct stands of white cedar, sites of severe human disturbance such as the Shelburne barrens.

The Rationale for Heritage Protection

There are two distinct aspects of heritage protection under discussion. One is the need to protect representative or outstanding examples of the various forest types which constitute the natural forest of the province. The other is a desire to maintain a cultural tradition of forest usage for a multitude of products and benefits. They are separate aspects of a single view of the forest legacy.

The first need is usually met by the creation of a system of ecological reserves or natural areas, where the vegetation, habitats, or features of interest will be protected. The benefits to be derived from such a system are many (Weetman, 1972; Ontario Ministry of Natural Resource, 1981). Their scientific value is perhaps paramount. By maintaining a relatively undisturbed environment, they allow scientists to study a variety of natural processes. Coupled with this, they provide opportunities for teaching, and may be considered to be outdoor classrooms and museums.

Also, in a world of decreasing natural diversity, they help to maintain gene pools of a variety of species. All plants now domesticated and used by humans were produced by selection from natural stocks. By maintaining gene pools of naturally occurring plants, ecological reserves provide a capital stock of genetic resources which may be required in the future. Finally, and not least in importance, they are important for cultural reasons. Their presence allows us to better understand and appreciate the natural environment upon which we depend. They maintain the natural diversity which enriches our environment. The ability to protect natural areas, to look beyond immediate economic gain, to see the longer-term benefits that maintaining a natural heritage for the appreciation of present and future generations, is a measure of the maturity of a society.

There is also the question of a tradition of use as a cultural heritage. This is much thornier. There is, in Nova Scotia, a tradition of recreational use of the forests, but, as discussed above, the question must be raised as to how much use can be sustained by this limited resource. Continued recreational use of the forests can be achieved, but only through changed attitudes on the part of the users and by continual improvement in management practices.

Although the province is too small and has had too long a settlement history to have any true wilderness remaining, (i.e. areas free of human influence, where natural processes run their course), there is a tradition in Nova Scotia of backcountry use. It has been possible to achieve some aspects of the "wilderness experience"--the perception of remoteness and solitude--in areas which have been relatively easy to reach, yet isolated in the Nova Scotia context.

There remain a few areas in the province where the opportunity to enjoy these experiences exist and where sound management practices can be applied to ensure that these opportunities are not lost.

The Ability to Protect Heritage Resources

Legislation currently enacted is adequate to provide the basis for a program of heritage preservation. The Provincial Parks Act (c.244, R.S.N.S. 1967), provides, through Section 6(c) for parks to be established for "the preservation of areas and objects therein of geological, ethnological, historical or other scientific interests". Broadly interpreted, this section provides the authority for the establishment of a natural area or ecological reserve class of park. Section 11, (c) and (d) assigns further powers to protect designated areas while Section 12 provides the basis for regulatory measures.

A complementary piece of legislation is the Special Places Act (c.17, S.N.S. 1980), which is administered by the Nova Scotia Museum. Section 3(b) explicitly states the objectives of protecting important ecological sites. Section

14 allows for the designation of ecological sites on either private or Crown land. The effect of such designation is largely dependent upon the regulations which may be made under Section 20, especially (c) and (d). The Act is much more specific in its intent and perhaps narrower in its application than is the Provincial Parks Act.

Between the two, an adequate legislative base exists for the protection of ecological sites. An area could be both an ecological site under the Special Places Act and part of a Provincial Park, or could be protected by either Act alone. The Special Places Act has the advantage of having some control over the use of sites on privately owned land. The Provincial Parks Act, however, allows for the use of the field staff and management capability of the Department of Lands and Forests.

The information base as it currently exists is adequate to enable the initiation of a program to protect ecological sites. A study which was completed in 1974 as part of the International Biological Programme (IBP) identified 69 sites, totalling 20 000 ha (50,000 acres), which were suitable candidates for ecological reserve status. Of these, 34 sites, comprising 10 900 ha (27,000 acres) were forested.

It has been recognized that this study was not comprehensive, and that many important sites might well have been overlooked. Similarly, some of the identified sites might be excluded if a more comprehensive assessment of provincial sites were undertaken. Nevertheless, it is useful as a starting point for an ecological reserves program.

Recently, steps have been taken to improve the data base. In 1979, the Department of Lands and Forests and the Nova Scotia Museum began the joint sponsorship of a study of the natural history "theme regions" of the province. It is expected to be a useful working document for both agencies, as the data base it establishes can continually be added to as more information becomes available. It will help in the selection of candidate sites for both Provincial Parks and ecological reserves by identifying areas which are representative of either habitat types or of a particular region.

With these two major studies in hand, the capability now exists for the Province to embark upon a program of protection and interpretation of the natural history of its forests.

The tradition of access to and multiple use of the forests is also reflected in existing legislation. A number of Acts specifically deal with access for recreation.

(i) The Angling Act provides the right of access to all bodies of water in the Province. Any resident can walk along the banks of a water body or across uncultivated land for the purpose of fishing with a rod and line.

(ii) The Trails Act. Passed in 1978 but not yet proclaimed, this Act provides for the establishment of Provincial Trails on both private and Crown land. The effect of designation as a Provincial Trail is to create a right of access for recreation to the trail, and limits the liability of the owner of the land on which the trail is located. Trails may include watercourses as well as trails on land.

(iii) An Act for the Protection of Property (C.13, S.N.S. 1982) Enacted in 1982, this Act attempts to protect certain classes of property. Section 3(1)(e) allows the posting of signs prohibiting entry on private property. A person cannot be prosecuted for contravening such a notice on forest land if engaged in a recreational activity.

In addition to requiring access to the forests, the recreational experience depends in part upon the aesthetic and environmental qualities of the forests. The Forest Improvement Act (C. 114, R.S.N.S. 1967) is intended to maintain and enhance these qualities.

The Beaches Preservation and Protection Act (C.6, S.N.S., 1975) governs the use of beaches, and is administered by the Department of Lands and Forests. Its intent is to maintain the beaches of the Province "unimpaired for the enjoyment of future generations". The Act deals primarily with the control of sand and gravel extraction; however, the regulations also make it possible to control the disposal of litter and the use of vehicles on beaches. The Act has been particularly successful in preventing such damage to beaches; but problems of abuse by recreational users have not been effectively curbed as the administration of the relevant regulations has proven difficult.

4. MANAGING OF OUTDOOR RECREATIONAL OPPORTUNITIES IN THE FOREST ENVIRONMENT

Forest Management Planning

The idea of managing the forests to obtain a range of benefits of different types, such as wood fibre, recreation, and wildlife is particularly apt in Nova Scotia. Our relatively small land base precludes dedicating extremely large tracts of land to a single purpose. If the needs of all forests users are to be met, an integrated forest management approach must be followed. This approach has been initiated by the Department of Lands and Forests.

An early effort in 1975 was directed at a 1 060 km^2 (400 sq. mi.) area in southwestern Nova Scotia which is identified as the Tobeatic Resource Management Area. Produced in cooperation with the Canadian Forestry Service, the management plan that was drawn up attempted to integrate the demands of recreation, wildlife and forestry, largely through a zoning approach within the management area.

To date the plan has not been fully implemented. But as the first major effort at integrated resource management planning it serves as a useful model and reference point for future work. A second area, the Eastern Shore Resource Management Area in Halifax County, has also been proposed. This area is an integral component of the Eastern Shore Seaside Park System, for which integrated resource management concepts are under consideration.

Also in 1975, the Province established a Resource Planning Unit charged with the responsibility of preparing integrated resource management plans for the Crown lands. These plans will be the result of the joint efforts of the Forest Planning, Wildlife and Parks and Recreation Divisions. The recreational component of these plans will emphasize two elements: 1) the identification of areas of partiular importance for recreation, which should be managed with recreation as their primary use, and 2) the establishment of guidelines for forest practices will take recreational needs into consideration. In the second case, for example, the location of forest access roads; and the nature, location and timing of harvesting, all have effects on the recreational value of an area. By taking recreational considerations into account at the start of the planning process, many potential problems will be avoided.

The Management of Forest Recreation

Integrated forest management planning will work to ease the problem of undersupply of recreational opportunities (described in Chapter 2) by promoting effective utilization of Crown land through multiple-use. This approach will also help control many common problems currently associated with Crown land recreational use. At the core of these problems is uncontrolled access and use. A long history of settlement and wood harvesting has created a network of forest access roads, many of high quality, throughout the province. Widespread use of off-road vehicles and 4-wheel drive vehicles has increased the use of all but the most remote of these roads. The result has been an increased access to and use of what were formerly considered to be "backcountry" areas.

Trailer camping is coming to be a common feature at many lakes in the province, often without measures for garbage removal and sewage disposal. The result can be a deterioration in site and water quality, and the poor use of valuable shoreline. Also, as much of the province's land and water has low productivity for game and fish, the maintenance of exploitable populations depend in part upon the controlled access. This will be an important consideration in management planning for forest recreation. Where desirable and feasible, such an approach will be proposed.

There is another problem which will benefit from integrated forest management planning. The quality of the recreational experience can suffer from unrestricted access. In addition to the problems of litter and site degradation, some recreational pursuits are dependent upon a degree of solitude and isolation which gives the activity a special meaning. In a situation where all access is wide-open, this experience will not be available.

As discussed in Chapter 3 the legislative base to effect the required management practices is largely in place. An obvious gap, however, is the lack of a mechanism to regulate the activities of recreational users of Crown lands. Improved capability in this area would be highly desirable in order to enable the curtailment of abuses and the control of access for recreational use. The inclusion of provisions in the Lands and Forests Act for this purpose should therefore be considered. The type of regulation required need not be unduly restrictuve but should provide, among other things, for the designation of access points and camping areas.

Forest recreation management must also address the problem of providing recreational access to privately owned lands. Much of the higher quality recreational lands of the province are held in private ownership. The right of the public to gain access to land and water for recreation is protected by legislation. As discussed in Chapter 3, the Trails Act, the Angling Act and the Act to Protect Property all contain provisions for recreational access.

Conflicts between landowners and recreational users are inevitable, and as recreational use increases, may be expected to occur more frequently. The predictable outcome of such conflicts is the restriction of public access to private lands. Formalization of controlled access and use of private land for public recreation will therefore be an essential ingredient in long term planning for the management of the provincial resource base. The potential for such a mechanism exists in the Trails Act.

5. CONCLUSION: THE PROVINCIAL APPROACH

The Provincial Parks Program in Nova Scotia is relatively young, having been established under the Provncial Parks Act which was passed in 1959. The early emphasis of the program was on meeting the needs of the travelling public through the establishment of high quality roadside parks that provided basic services and amenities. The Parks Act contains a broader mandate which lays the foundation for a system of parks which would not only provide recreational opportunitities and services but which would afford protection to and interpretation of the natural heritage resources of the province.

In Nova Scotia, several Government Departments have related roles to play in the delivery of facilities and services in the broad context of outdoor recreation and resource conservation. In recognition of this, the Deputy Ministers Committee on Land Use Policy recently adopted a goal and a set of objectives for the Parks, Heritage Resources and Outdoor Recreation System/Program which embrace the complementary activities and gives them a well defined common focus as well as a vehicle for coordination. The goal and objectives provide the broad policy framework within which the Provincial Parks and Outdoor Recreation System, which plays the largest role in the delivery of recreation opportunities and facilities, is now being developed.

The objectives deal with four key functions, including: Preservation and Protection, Interpretation and Outdoor Education, Outdoor Recreation, as well as Travel and Tourism. The 97 park units which are presently operated in Nova Scotia are largely oriented to meeting the Outdoor Recreation and the Travel and Tourism objectives, whereas the two objectives pertaining to Preservation/Protection and

Interpretation/Outdoor Education have only received attention in recent years.

This brings into focus the first major problem facing the Provincial Parks and Outdoor Recreation Program: imbalance. The Nova Scotia Parks and Recreation System Plan (Lands and Forests, Boggs, 1976) contains the base philosophy on which a Provincial Parks System is built. In this base philosophy, reference is made to the need for balance between preservation and development, intensive and extensive use, single-purpose and multiple-use, as well as accessibility and isolation. In keeping with the basic expectations of the populace and the resource potential of the recreational landscape, all are required. Steps are being taken to address these imbalances, but more needs to be accomplished.

The second major problem which faces our Provincial Parks Program is inadequacy of supply. This problem manifests itself in several ways. There are not enough dedicated public lands to met the demand for recreational opportunities. There is an uneven distribution pattern which results in major shortfalls of recreational facilities near major urban centres. The land ownership pattern means that only 25% of the land is in Crown ownership and most high quality recreational land is in private ownership. Domestic and foreign interests compete for high quality recreational lands.

The statements which follow outline the Provincial approaches to solving these two problems.

- Land Assembly - In order to achieve the highest level of management control on key recreational sites and natural areas, the acquisition of park land and the dedication of existing Crown land will continue to be important aspects of the Provincial Parks and Outdoor Recreation Program. Innovative approaches to land acquisition such as land trades, encouragement of land donations, easement purchases, and the establishment of a philanthropic fund for land acquisition are all worthy of consideration, especially at a time when capital for such purchases is limited.

- Public Access to Private Lands - In Nova Scotia the private ownership of land extends to approximately 75% of the total land area. At best, the Crown can provide access to and management of about 25%, which is primarily located where the population is not. Mechanisms to ensure public access to privately owned high quality recreational lands are essential if the traditional patterns of publc access and use of high quality recreational lands is to continue. The Trails Act, which was enacted but is not yet proclaimed, provides one such mechanism. Another approach might be to negotiate agreements for public recreational access to large blocks of privately owned lands.

- Integrated Resource Management - To meet the ever growing demands on resource lands and to solve the conflicts of competing uses, the management of these resource lands must be approached on the basis of planned integration of many uses. Through this process resource managers must seek to determine the optimal use of the land for economic, social and other benefits, allocating lands to single purpose or predominant uses where necessary but integrating a variety of uses where feasible and desireable. Planning for the implementation of this approach on all Crown-owned resource lands has been initiated.

- Resource Based Parks - The Provincial Parks System is largely characterized by small facility or use oriented parks. To provide balance in the System, to achieve Preservation/Protection and Interpretation/Outdoor

Education objectives as well as to provide opportunities for extended destination stays, emphasis will continue to be placed on the establishment of larger, resource-based Provincial Parks.

- Ecological Reserves Program - The International Biological Program identified significant natural sites which should be protected for scientific and educational reasons. Legislation has been passed in the form of the Provincial Parks Act and the Special Places Act, which will afford protection to unique, or significant natural sites. Through the implementation of the Special Places Program, and its integration with the Provincial Parks Program, effective protection should be provided for appropriate sites.

- Resource Inventory and Demand Analysis - In order to rationalize the acquisition of the land required to meet the demand for outdoor recreation and to achieve Preservation/Protection and Interpretation/Outdoor Education objectives, the process of inventorying the resource base of the Province through the Theme Regions Study and follow-up inventories, will continue. It is also important to establish a comprehensive inventory of existing and potential outdoor recreational opportunities. Paralleling these efforts, it is necessary to place emphasis on obtaining a clear picture of existing use and demand for recreation opportunities, as a basis for making sound investments in lands and facilities for recreation and tourism objectives. A commitment of resources to this process is anticipated as they become available.

- To stem the trend of opening all of the backcountry in Nova Scotia to easy access, thereby eliminating the potential for high quality extensive recreation opportunities, an additional management tool is proposed. Revising the Lands and Forests Act to provide regulations for control of recreational access and to enable designation of limited camping locations on Crown lands, would help to achieve this.

- The perception that non-resident ownership of land in Nova Scotia is growing and that it represents a drain on resource lands by limiting management options and escalating prices, makes it a significant area of concern. Determing the extent and impact of non-resident ownership is desireable. This would provide a basis for making decisions on ways of monitoring this activity.

The keys to ensuring that Nova Scotians enjoy sufficient opportunities for outdoor recreation, heritage appreciation and scientific research (on natural sites) are:

- Allocation of sufficient quantity and quality of resource lands to meet the needs and expectations of present and future generations both within and outside of dedicated Provincial Park lands; and,
- Management of resource lands both within and outside parks to maintain environments which will yield high quality opportunities for these activities.

As Provincial forest policies are now being critically evaluated, it is important to recognize the fit of the Parks and Outdoor Recreation Program as a land use, and to ensure that it is placed in the proper perspective relative to other uses of resource lands.

6. SUMMARY

The Provincial Parks Program in Nova Scotia is relatively young, having been established under the Provincial Parks Act which was passed in 1959. The early emphasis of the program was on meeting the needs of the travelling public through the establishment of high quality roadside parks that provided basic services and amenities. The Parks Act contains a broader mandate which lays the foundations for a system of parks which would not only provide recreational opportunities and services but which would afford protection to and interpreation of the natural heritage resources of the Province.

In Nova Scotia, several Government Departments have related roles to play in the delivery of facilities and services in the broad context of outdoor recreation and resource conservation. In recognition of this, the Deputy Ministers Committee on Land Use Policy recently adopted a goal and a set of objectives for the Parks, Heritage Resources and outdoor Recreation system/Program which embrace the complementary activities and gives them a well defined common focus as well as a vehicle for coordination.

The goal and objectives provide the broad policy framework within which the Provincial parks and Outdoor Recreation System, which plays the largest role in the delivery of recreation opportunities and facilities, is now being developed. The objectives deal with 4 key functions, including: Preservation and Protection, Interpretation and Outdoor Education, Outdoor Recreation, as well as Travel and Tourism.

The 97 park units which are presently operated in Nova Scotia are largely oriented to meeting the Outdoor

Recreation and the Travel and Tourism objectives, whereas the 2 objectives pertaining to Preservation/Protection and Interpretation/Outdoor Education have received attention only in recent years.

This brings into focus the first major problem which faces the Provincial Parks Program: the lack of balance within the System. The Nova Scotia Parks and Recreation System Plan (Lands and Forests, Boggs 1976) contains the base philosophy on which a Provincial Parks System is built. It refers to the need for balance between preservation and development, intensive and extensive use, single-purpose and multiple-use, as well as accessibility and isolation: all of which are required in keeping with the basic expectations of the populace and the resource potential of the recreational landscape.

The second major problem which faces the Provincial Parks Program in Nova Scotia is the inadequacy of the supply of public recreational opportunities. This problem manifests itself in the form of an inadequate supply of public lands to meet the demand for recreational opportunitites, an uneven distribution pattern (which results in major shortfalls of recreational facilities near major urban centres), a land ownership pattern which means that most high quality recreational land is in private ownership, and competition for high quality recreational lands from domestic and foreign interests.

The Provincial approach to solving these problems and developing a well balanced Provincial Parks & Outdoor Recreation System involves a number of steps, including:

- Continued emphasis on land acquisition;
- Provision of public access to privately owned recreational lands through such means as the Trails Act;
- The planned integration of uses on all Crown owned resource lands;

- Continued emphasis on larger resource based parks;
- The anticipated implementation of an Ecological Reserves Program;
- The continuation of resource inventory & demand analyses;
- A proposal to amend the Lands and Forests Act in order to provide control of back country recreational use;
- A proposal to determine the extent and impact of non-resident ownership in Nova Scotia.

The keys to ensuring that Nova Scotians enjoy sufficient opportunities for outdoor recreation, heritage appreciation and scientific research (on natural sites) are:

- Allocation of sufficient quantity and quality of resource lands to meet the needs and expectations of present and future generations both within and outside of dedicated Provincial Park lands; and,
- Management of resource lands both within and outside parks so as to maintain environments which will yield high quality opportunities for these activities.

  As Provincial forest policies are now being critically evaluated, it is important to recognize the fit of the Parks and Outdoor Recreation Program as a land use, and to ensure that it is placed in the proper perspective relative to other uses of resource lands.

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